TENTH ANNUAL REPORT

—OF THE—

PROVINCIAL

BOARD OF HEALTH

—OF—

ONTARIO.

1891.

TENTH ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH

OF ONTARIO.

BEING FOR THE YEAR

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST, TORONTO,
1892.

TABLE OF CONTENTS.

PART I.

	PAGE.
Introduction by the Chairman	1
Secretary's Report	3

PART II.

Report of Delegate to International Congress of Hygiene and Demography	43
Quarterly Report of Secretary *re* Water Supplies and Diphtheria	49
Secretary's Quarterly Report *re* Animal Diseases	52
Report of the Secretary *re* the Acton Tannery	54
Report of the Secretary *re* Streetsville Cemetery	56
Report of Neustadt Tannery	56
Report *re* the Ontario Vaccine Farm and Drainage of Palmerston	57
Report *re* Sanitation in Listowel	58
Correspondence *re* Detroit River Quarantine Inspection	59
Report of Secretary *re* Sewerage at St. Mary's	63
Communications *re* Transportation of the Dead and Copies of Resolutions	64
Report *re* Proposed Sewerage System for Toronto Junction	66
Report of Secretary *re* Disposal of Sewage at Agricultural College	69
The present position of the Milk Supply Problem from the Public Health Standpoint, and some Practical Methods for securing safe Public Supplies	70
Chairman's Annual Address	81

PART III

Annual Reports from Local Boards of Health	85

TENTH ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH.

To Sir Alexander Campbell, K.C.M.G.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honor :

In presenting the Tenth Annual Report of the Provincial Board of Health, it is pleasing to note that during the past year the Province has been singularly free from outbreaks of contagious disease. Diphtheria it is true still continues to claim many victims, especially among children. As this Board has previously had occasion to remark, there is no single cause which contributes so largely to the dissemination and continuance of this pest as the introduction of its contagion into the school-room. Thorough and frequent cleansing of school-rooms, together with efficient ventilation and good heating, would act very powerfully in removing this source of contagion. It is also very desirable that the establishment by Local Boards of Health of isolation hospitals for the treatment of this disease should receive a great impetus. Removing the infectious from the healthy prevents them from becoming fresh centres of contagion, and this, together with the necessary disinfection of exposed articles and the discovery of the cause of the outbreak, places the sanitary authorities in a position to prevent its further dissemination. Now that all outbreaks of diphtheria must, by Order in Council, be reported to the Provincial Board of Health, we are placed in a better position to assist the municipal authorities in applying the proper remedies.

The tracing of typhoid fever to the use of potable water polluted with excreta is undisputed. So true is this that a wholesome water supply will practically banish this disease from a city. But when, on the other hand, a city draws water from a lake into which its crude sewage is discharged, there is danger that at times the water will become impure. Bacteriological examination of Lake Ontario water close to the Toronto water-works intake proves that, according to the direction of the wind, sewage-tainted water with a very slight diminution of the bacteria, can be transported a considerable dis-

tance. Mere dilution of sewage will therefore prove insufficient. The city sewage should be intercepted and treated at the outfall so as so produce an effluent, which being free from bacteria could be safely discharged into the lake. The special germs of typhoid fever being thus destroyed its reintroduction by means of the water supply would be prevented.

The diseases of animals, such as tuberculosis, anthrax. and actinomycosis, have received considerable attention in the laboratory of the Board during the past year, and a reference to our Secretary's report will convince the reader that prompt and thorough extinction of these diseases is of great importance to the well being of many lucrative and useful industries.

A wholesome water supply being a prime necessary of good health. and contamination of potable water from various causes being unfortunately but too common, it is satisfactory to know that by the use of some of the most modern artificial systems of water filtration an inferior can be converted into a first class water. Some of these have for several years been in operation in several cities of the United States. At St. Thomas three Hyatt filters with a filtering capacity of 1,500,000 gallons are now in operation. A bacteriological examination of the St. Thomas water made by the officials of this Board, both before and after filtration, shows a very high degree of efficiency in these filters.

The municipal councils of this Province have not neglected that provision of the Ontario Health Act, which calls for the appointment every year of Local Boards of Health. There are at present 531 Local Boards of Health, and of these 332 have appointed Medical Health Officers.

This Province is fortunate in possessing so many estimable and useful citizens who, without fee or reward, other than that of an approving conscience, devote themselves to the greater good of their neighbors, and the extension to all of some of the best blessings of civilisation. Modern sanitation, however, is rapidly leaving uncertain and debatable ground, and in the hands of skilled Medical Health Officers is pointing with precision to known and removable causes of disease ; and we observe with sincere pleasure that medical men of high attainments are thus enabled through the appreciation of an intelligent public to devote themselves almost entirely to the practice of preventive medicine.

Trusting that with the onward march of medical science and the diffusion of sanitary knowledge among the people an enlightened sentiment in regard to the true methods of preventing contagious diseases, and greater energy in removing the recognised conditions which favour their spread, may grow and still further develop amongst us,

I have the honour to remain,

Your obedient servant,

J. J. CASSIDY.

PART I.

REPORT OF THE SECRETARY.

CHAPTER I.

A HUNDRED YEARS OF SANITATION IN ONTARIO.

To the Chairman and Members of the Provincial Board of Health:

GENTLEMEN.—It gives me pleasure to recall to your recollection the fact that the year 1891 completes the first decade of this Board's existence, and ten years of the first permanent governmental organization for dealing with health matters of provincial interest and extent in Ontario.

This year likewise completes one hundred years of organized government in the Province of Ontario, or Upper Canada, and it may not be without interest that a survey of the century be made, and that something of a comparison be instituted between the health conditions of the last decade and of those which have preceded it.

When Governor Simcoe, with his executive councillors, passed westward from Kingston to establish law and government in the newly created Province, settlement can be said to have existed in little more than name. Though Kingston and Newark had been settled they held few others than soldiers of the garrisons. Whatever settlers had come into the country were from the lately rebellious States, and their views on the subject of Medicine were doubtless those prevailing at the time in the United States.

Then was the period "of systems of medicine, wrought out by the imaginations of some few of the great leaders of our profession." The systems of Boërhave of Leyden, Cullen and Brown of Edinburgh, and Darwin of England, had each had their day, only to be succeeded in the United States by that of Benjamin Rush, a revolutionary and signer of the Declaration of Independence, a member of Congress, and Professor of Chemistry in the University of Pennsylvania. He it was who said "that the time must and will come when, in addition to the above remedies, viz., air, light and water, which are used by all without a physician's advice, the general use of calomel, jalap and the lancet shall be considered among the most essential articles of the knowledge and rights of man;" and of whom his political colleague, Thomas Jefferson, said in writing to a medical friend in 1807: "We have seen the fashions of Hoffman, Boërhave, Stahl, Cullen and Brown, succeed one another like the shifting figures of the magic lantern; and their fancies like the dresses of the annual doll-babies from Paris, becoming from their novelty, the vogue of the day, and yielding to the next novelty in ephemeral favour."

With the establishment of government and society, having an especially English form and fashion, the early physicians of prominence in Upper Canada brought their views from the schools especially of London and Edinburgh*. In the few medical names

*Strange as it may appear to the present medical profession a Medical Board for examining and licensing practitioners in Upper Canada existed as early as 1815, and in 1832 the only persons entitled to practice without such examinations were licentiates of the Royal College of Surgeons of London.

coming down to us we find those who may be said to have grown up with the theories developed during the so-called "epoch of observation" in Medicine, made famous by the great teachers of the French school, Andral, Louis and Chomel. This era beginning with 1830, saw in England, at a period when Canada was in the throes of a political rebellion, the elements of modern Medicine taking form, though as will be seen later on, very practical views were held in some quarters with regard to what sanitation meant on its preventive side.

In 1832, Edwin Chadwick, an English lawyer and writer on economic questions, was made secretary to a Commission of Enquiry into the poor law system of that country, and in 1838 he persuaded the Poor Law Board to make an enquiry into an outbreak of typhus fever in the Whitechapel district of London. The publication of this first sanitary report created a sensation in London; while the same year was made further notable by the appointment of the late Dr. William Farr as the first Registrar-General of births, marriages and deaths.

In Upper Canada at this time the medical profession was in an unusually advanced state, there existing a Medical Board, with power to examine new-comers into the Province, and grant licenses to practice. Its views on medical practice, as also the powers it exercised, partook largely of the autocratic methods in vogue in other legislative matters of the time. There may be found in one of the old newspapers of the time, a letter, complaining loudly of the fact that the licentiates of the Royal College of Surgeons, London, were the only persons entitled to practice without a previous examination by the Medical Board; and the complaint was the more well-founded from the fact that while these surgeons were entitled to practice both medicine and midwifery, they were empowered to examine licentiates from Dublin, from the Apothecaries' Hall, London, and from Edinburgh University, who were already licensed in medicine and midwifery.

Strange as it may seem, the exigencies of the colony had already called into existence laws for protecting the public health. As will be seen later on in a review of the public health Acts of the Provinces of Upper and Lower Canada, the emigration which came in by way of the St. Lawrence had created an ever present danger to the health of the colony. The long ocean passage, principally by sailing vessels, and the wretched condition of many of the immigrants, occasioned the frequent introduction of pestilential diseases, amongst which typhus, or ship-fever, and cholera were the most common.

This is illustrated in the Report to the Legislature of the York (Toronto) Hospital and Dispensary, dated York, Nov. 19th, 1832, which is as follows:—

> The great increase in the population of this town and its vicinity, and the misery and wretchedness of the lower classes of emigrants could not fail to disseminate amongst them disease in its various forms. . . . Typhus fever, in its most malignant form raged to a most alarming extent; many of the fatal cases above reported upon have been of this malady brought into hospitals from the steamboats or from the confined and filthy parts of the town. . . . It is worthy of remark that most of the lower orders have such an aversion to an hospital, that they will not submit to be removed until they are conveyed hither in a state of insensibility.
>
> (Signed) C. WIDMER, Surgeon.
> P. DIEHL, Surgeon.
> JOHN KING, M.D.
> JOHN ROLPH, Surgeon.

The hospital register gave the following:—

Acute disease	408
Surgical	88
Chronic, medical	74
Adults and children received aid and medicine at dispensary	2,100
Removed, last return	17
Since admitted	548
Discharged, cured	437
Relieved	8
For surgery	1
Died	61
Remaining	58

In this same year cholera was introduced into Canada by way of the St. Lawrence, and though it disappeared in the early autumn, its ravages were of an extended and most fatal description. It was a mysterious disease to the medical profession in Canada, and here, as elsewhere, the knowledge of its causation and method of propagation were the subject of constant speculation. Many supposed that winds of some peculiar and special character spread the disease from country to country, and the reports which had reached Canada of its westward march from India in 1827 to Russia in 1829 and later to Britain had created serious misgivings lest it should be transported to these western shores. To the end of preparing for such a contingency the Canadian Executive of Lower Canada published in October, 1831, a communication on the subject of cholera transmitted from the Colonial office in London. On its receipt a conference of physicians was called in Quebec to discuss the matter, with the result that the Government despatched M. Dr. Tessier to New York to there study the measures being adopted against the introduction of the disease.

The first Sanitary Commission instituted in Canada to deal with cholera was appointed in Quebec in February 1832, and was composed of Drs. Morrin, Parent and Perrault, and some months later a Board of Health was organized which adopted some quarantine and other regulations.

Though not appearing in epidemic form till June, the first cases of cholera arrived in the St. Lawrence on April 28th, 1832, and were landed at Grosse Isle from the ship, *Constantia*, from Limerick, having 170 emigrants of whom 29 had died on the voyage.

On May 14th, the ship *Robert* from Cork arrived and had 10 deaths on the voyage.

On May 28th the ship *Elizabeth* from Dublin arrived with 145 emigrants and 42 deaths.

But the weather by June had grown warmer, and on June 3rd the ship *Carrick* from Dublin arrived having had 145 emigrants of whom 42 had died on the voyage.

This may be said to have been the beginning of the epidemic in Canada. The Grosse Isle station, having only been opened that spring, there were no conveniences, and no proper quarantine precautions. All who seemed well were allowed to pass up the St. Lawrence, disinfection was unknown, and hence all the soiled clothing of the emigrants was forwarded unwashed. Further there was constant intercourse between sailing and steam vessels westward to Montreal. It ascended the Richelieu and thence reached Lake Champlain and the Hudson.

By June 10th the disease had reached Montreal and spread rapidly to different parts of Lower and Upper Canada. It had disappeared by the middle of October, having lasted four months.

The discontent and famine in Ireland had caused an extensive emigration to American shores, and by September nearly 30,000 emigrants had come up the St. Lawrence.

Deaths amongst these people were so common from every cause, that no very special record was kept of those from cholera; but it is stated that in Quebec there occurred during this fatal summer 2,208 deaths from cholera alone, and that in Montreal 800 deaths occurred in the first fortnight and by September 1,843 had been slain by the disease.

In this brief history we have seen that some idea had been obtained of the necessity for preventing the introduction of cholera by establishing quarantine; but the results make apparent the ignorance of what was necessary to be done to attain such an end.

Returning, however, to Upper Canada it will be seen that the epidemic of 1832 soon passed westward from Montreal appearing in Prescott on June 14th. That the colony was greatly agitated at the advent of this mysterious plague is seen from the following letters found in the Journals of the Legislative Assembly of 1833; while the circular of the Lieutenant-Governor and the Order in Council are most interesting as showing the intelligent appreciation of the public danger, and of the prompt action taken to do all which the knowledge of the time made possible, for the limitation of the disease.

The following letter is dated Kingston June 14th, 1832, and is given along with a statement of sums advanced by authority of the Lieut-Governor and spent in preserving the health of the Province during the prevalence of cholera.

I beg to transmit for the information of His Excellency the Lieut-Governor a copy of the proceedings of a public meeting of the inhabitants of Kingston, held this day, with the resolutions that have been unanimously adopted. . . . As certain intelligence has been received that the disease called Asiatic Sporadic Cholera has appeared both at Quebec and Montreal, the committee of management appointed at this day's meeting are anxious to proceed with vigour, and without delay in carrying into effect such measures of prevention and relief as may be judged most necessary.

And at their request, I beg to inquire whether His Excellency has any fund at his disposal with which it will be in his power to aid the committee in the prosecution of their charitable intentions; whether, in this case of peculiar emergency, His Excellency would feel authorized to place at the disposal of the committee any sum, although there should be no specific fund to meet such calls.

May I beg on behalf of the committee to be informed of His Excellency's pleasure at the earliest convenience.

I have, etc.,

(Signed) ROBERT D. CARTWRIGHT.

EDWARD MCMAHON, Esquire, etc., etc., etc.

(A copy)
WILLIAM ROWAN.

The following is a letter from Prescott of the same period :—

PRESCOTT, June 16th, 1832.

I have the painful duty of informing you, for the information of His Excellency the Lieutenant-Governor, that the cholera has broken out in this place. There have been three cases since 12 o'clock this day. A number of persons, boatmen and others, have died of the same disease within the last two days (say the 15th and 16th instant) between this and Cornwall. A number more have died between Cornwall and Montreal. I speak of boatmen, emigrants and sailors. Many of the boats on their way up have been deserted by their crews. There are a number of boats within a few miles of this place laden with emigrants who are as yet in a healthy state. All is consternation here.

Will not His Excellency immediately send us some assistance? We have no funds at our disposal. The port being almost the only one where the emigrants are landed from the Durham boats and Batteaux, and reshipped on board of steamboats for the different ports on Lake Ontario, renders it necessary that the utmost vigilance should be used to prevent its spread if possible. I again ask will His Excellency not send some efficient person to our assistance, clothed with the necessary authority to supply funds, and to enforce the necessary rules and regulations.

I refer you to Dr. Scott's letter to Dr. Widmer on the subject.

And I am, etc.,

(Signed) A. JONES.

The following is His Excellency's reply :—

GOVERNMENT HOUSE, YORK, 19th June, 1832.

SIR,—With reference to your communication of the 16th instant, I am directed by the Lieutenant-Governor to acquaint you that His Excellency will arrange with the bank to place five hundred pounds at the disposal of yourself and Mr. Patton, to be employed in any way you may think beneficial to the community. His Excellency begs of you to call to your aid the magistrates and respectable persons of your neighbourhood to form boards of health, and to request that the magistrates will assume all authority that may be necessary on the occasion.

I have, etc.,

(Signed) E. MCMAHON.

ALPHÆUS JONES, Esq.,
Prescott.

(A copy.)
WILLIAM ROWAN.

The following is a circular addressed by the Government to the Chairman of the Quarter Sessions of the several districts on the breaking out of the cholera, dated 20th June, 1832 :—

SIR,—The contagious disease which has extended its ravages to Lower Canada, having appeared at Prescott in this Province, it becomes necessary to take immediate precautionary measures for arresting its progress, as far as human means can avail. I am, therefore to acquaint you, by command of the Lieutenant-Governor, that His Excellency, in the full confidence that the legislature will sanction the adoption of any measures which the present exigency may require, requests that you will convene the magistrates of the district, and with their aid form a Board of Health

With the advice of the Executive Council, His Excellency directs that the Board shall assume the authority of enforcing such arrangements as a due regard to the preservation of health may require, and

places at the disposal of the magistrates in each district the sum of £500, to defray the expense of the disbursements that may become necessary for providing hospitals and medical attendence, and for making the arrangements that the medical board of each district, to be formed at the request of the Board of Health, may suggest.

I am also to state, that the chairman of the Quarter Sessions of each district will be furnished from this office with any printed instructions or recommendations which it may be advisable to transmit, and to request that the magistrates may be earnestly enjoined to forward regularly such statements of their disbursements as will enable the executive government to account satisfactorily in detail for whatever moneys they may find it necessary to expend.

The District of Ottawa and the District of London are apparently little exposed to danger of infection, but His Excellency confides in the discretion of the magistrates of those districts to make no unnecessary disbursements.

I have, etc.,

(Signed) E. McMAHON.

(A copy.)
WILLIAM ROWAN.

In the Journals of the House of Assembly, 1833, is a report of a Select Committee on Cholera Accounts, of the total amount (advanced by His Excellency to the several districts of the Province, there being eleven in all) of £4,439 19s. 0½d. expended.

The purposes to which the above several sums of money have been applied are various, but two of the principal items of expenditure are for the erecting and maintaining hospitals, and fees to medical gentlemen for attending cholera patients. The latter charge exceeds £700.

It is only doing justice to the medical gentlemen of the Midland and Home districts, where the epidemic raged with great violence, to state, that they have received no pecuniary remuneration whatever from public funds for their arduous services.

The report states that much good was effected by the aid of private subscriptions in every part of the Province, but in one instance only is the amount stated, this being the Town of Kingston, where the sum of £223 14s. 5d. was paid by individuals towards alleviating the general calamity.

The report further states the appreciation held of His Excellency the Lieutenant-Governor (Sir John Colborne, K.C.B.) for the promptitude with which, on his own personal responsibility, and not from the public funds, he provided means to arrest the ravages of a disease whose mysterious course and fatal effects, for a season, spread desolation and dismay throughout a large portion of the inhabited part of our happy Province.

The report is signed,

H. C. THOMPSON,
Chairman.

That the Province was alive to the danger of the return of cholera is learned from the fact of an Act being passed by the legislature 13th February, 1833 (whose provisions will be referred to later), entitled "An Act to establish Boards of Health, and to guard against the introduction of malignant, contagious and infectious disease in this Province, and for the formation of local boards" in 1833, as learned from the *Courier of Upper Canada*, in which the following is published referring to an advertisement therein. Under this Act a local board was formed in York, whose organization was published in the newspapers of the time. Regarding this advertisement the *Courier of Upper Canada*, of date April 17th, makes the following remarks :—

APRIL 17th, 1833.

"BOARD OF HEALTH.—We are happy to learn that His Excellency the Lieutenant-Governor has constituted a Board of Health for this town and neighbourhood, for the purpose of watching over the state of the public health and of making such preventive measures as may appear expedient. There are undoubtedly many local nuisances which require these gentlemen's immediate attention, and which, if not removed, must infallibly prove the fertile source of disease of some kind or another. In Terauley street there are large pools of water, covered with decomposed vegetable matter, which already send forth the most noxious and poisonous exhalations; and many other parts of the town exhibit similar nuisances. The following gentlemen constitute the Board of Health:—Grant Powell, Esq.; President. Jas. Fitzgibbon, Esq.; Secretary, Robert Staunton, Esq.; Dr. King; Dr. Gwynne; Wm. Gamble, Esq.; Jas. F. Smith, Esq.; M. T. Carfrae, Esq.; R. Cathcart, Esq.

☞Mr. Carfrae has declined to accept the appointment.

Not the least curious in this extract is the note, which beautifully illustrates the attitude which too many even to-day take when asked to act on our local boards.

As those of us of the present generation know nothing of cholera, except as telegraphic reports bring us news of its ravages in far off India and Persia, or occasionally from the shores of the Mediterranean, it is of interest to learn something of the ravages it has been capable of creating even in this northern climate during the warm weather of summer,

which alone makes its ravages possible. We have already seen how it was introduced in 1832, and the prompt measures taken by the then Lieutenant-Governor.

Its next appearance in serious proportions was in 1849, and regarding this epidemic in this Province the newspapers of the time give very full accounts. In these it is most curious to note how, as in more recent times, local commercial interests have minimized the dangers with the result of creating at a later stage evils of an extent impossible had prompt measures at the outset been taken for its limitation.

At this time, as even in later times, the doctrine was taught by many that cholera was not contagious. Thus it was stated, "It is no doubt true that when one person takes the cholera another may take it. The atmospheric conditions which produce the one may produce the other. But as to any direct communicability of air from one person to another it is no more likely in the case of cholera than in the case of a broken leg." This was the doctrine taught in November, 1848.

Cholera had then, in October, reached England *via* Hamburg in the person of sailors, which resulted in the City of London voting an allowance for its first medical health officer, Dr. Sutherland, at £500 per annum, to superintend the health of the metropolis and for recommending means for the public safety. The Government sent Drs. Grainger and Ayres to Hamburg to investigate the disease; and in November 4th the General Board of Health notified the public of the recent Act for the removal of nuisances and the prevention of diseases.

On June 1st, 1849, *The British American Journal* said: "Cholera has appeared in New York, Cincinnati and Chicago, and the Bill (of Parliament of Canada) for preserving the public health has received the sanction of law.. A great deal requires to be done, and this is not the time for doing it, when the disease has broken out and is daily numbering its victims. Let the Board of Health issue their directions. Let the cities be cleaned and this one particularly, for we believe it requires it more, and if the cholera arrives we will be prepared for it. . . . Two cases of sporadic cholera, presenting a number of the features of the Algide variety, and terminating fatally, the one in twenty-four hours and the other in eight hours, have occurred during the last week in Montreal. . . . . Cases of a similar description occurred in anticipation of the epidemic in 1832. We hope our authorities will profit by the warning."

How such warnings were heeded in Toronto is admirably illustrated by the following report of the doings of the city council from the *Globe* of June 21st:—

"There was a special meeting of the city fathers to take into consideration a subject of grave importance to the citizens of Toronto at the present time,—the appointment of a Board of Health."

A heated discussion took place regarding the injustice of the Bill which forced municipalities to form Local Boards to do the work according to the instructions of the Central Board, and then bear the expenses besides.

Alderman Workman (Dr. J. Workman) said: "This is not the time to discuss the Public Health Bill, but he thought it was on the whole a good Bill, the system of a Central Board was the best plan that could be adopted. Alderman Workman concluded by recommending the re-appointment of the present Board of Health."

On June 27th the *Globe* again stated: "The General Board of Health published its regulations from its office in Montreal on June 14th, 1849." These were signed by A. H. David, M.D., Secretary, and consisted of 24 sections, and approved of by the Governor in Council, Lord Elgin, on the 15th day of June, 1849, signed by the Secretary of Council, J. Leslie, Esq.

On July 12th, cholera was reported present in Toronto. The *Globe* of Saturday the 14th July, says: "The malady has appeared in our midst, but not to an alarming extent. We believe the best way is in all cases to tell the truth, the whole truth and nothing but the truth.

"As far as we have been able to learn the first case occurred on Friday of last week

(July 6th), and during the intermediate days the following are believed to be an accurate report of the cases which have occurred.

	Cases.	Deaths.
On Scott street, 1 resident; 1 emigrants	5	2
On King street east, an emigrant	1	1
On March street, an emigrant family	5	3
On Queen street west, a carter	1	1
In Hospital, all emigrants	3	3
Emigrant shed	1	0
	16	10

"A cholera hospital will be opened to day, and thanks to the activity of the Mayor every necessary precaution is being taken which the circumstances permit of."

On July 19th, Thursday, the same paper says: "There is some difference of opinion amongst the medical men whether Asiatic cholera is amongst us. Still the deaths are numerous whatever the disease."

On Wednesday, 8 a.m., the total number of new cases in the last 24 hours was 13, those previously reported being 66.

About this time Dr. Gavin Russell, Montreal, published a pamphlet "on the operation of physical agencies in the functions of organized bodies with suggestions as to the nature of cholera." His theory was that cholera is entirely occasioned by the absence or deficiency of electricity. Commenting on which the *Globe's* sanitary editor sagely remarks, "It is a fact that thundery weather hinders butter making by causing an escape of electricity from the milk, and the same cause prevents the working of the electric telegraph."

As illustrating the changes in the newspaper barometer we quote the following from the *Globe* of July 26th, its heading is: "The Cholera—National Humiliation."

"Whatever be the natural causes employed to produce the disease, it must be regarded by every reflecting mind, as a scourge sent from the Almighty and having in it a voice calling loudly for humiliation and deep thought."

The extent and conditions attending this most serious outbreak, were several years ago set forth in the records published in the Ontario Health Bulletin, 1881, and found at the end of this chapter, but the notes from various sources will be found of interest.

On July 24th the *Globe* gives the cases of cholera for the two previous days as 35 cases and 18 deaths. The next paragraph of news says: "Col. Alvah Mann's New York Broadway circus performed in this city on Friday and Saturday to crowded audiences."

The same issue of *Globe* says that the Local Board has issued a proclamation that all persons keeping pigs within the city and liberties will be fined £5.

A special order of July 25th of Central Board required local boards to have houses vacated when neglect to cleanse and crowding prevails.

The Local Board of London is recorded as having prohibited the sale of vegetable matters within the town during the prevalence of cholera.

Dr. Derry in charge of Toronto cholera hospital is referred to early in August as having resigned, his salary of $5 per diem being in his opinion wholly inadequate for the sacrifices of his private practice.

The Quebec *Mercury* has the following curious note. "Hearses and funeral carriages ply for hire in the streets of that city; a man has been seen strolling with his death carriage horsed and ready for use, the animal munching his oats and the driver on the look out for a fare."

On August 7th the Local Board of Montreal passed an order prohibiting all equestrian performances, concerts, etc., during the prevalence of the cholera.

A writer of the time in Paris correspondence makes the statement that 8,000-10,000 died in Paris within a fortnight.

August 15th. The cases in Toronto reported to date 414, deaths 254.

August 16th. A newspaper note refers to the capture of Dr. Rolph's horse on the street at night, standing in front of a house while the Doctor was visiting a patient, by a city policeman, under an order of council prohibiting horses standing on streets at night. The Doctor had to pay 1s. 10½d. to get him out of the city pound. Complaints of imperfect records by the Board were frequently made and refuted about this time.

Montreal papers, August 24th, report a ship at Grosse Isle with typhus, 30 deaths in voyage and as many more cases landed.

In London, England, at this time cholera increased rapidly. In the last of August, 1,276 deaths occurred in a week.

The cholera was abating in Montreal by Sept. 5th. Sept 11th the Toronto *Globe* states, we have still a few cases of cholera in the city. To date there have been 745 cases and 449 deaths.

By Sept. 22nd cholera had disappeared from Quebec, there having been 1,047 deaths there during the epidemic.

The deaths in New York per 1,000 in the three epidemics are given below :

1832, 15.7 per 1,000 ; 1834, 3.6 per 1,000; 1849, 11.35 per 1,000.

I have already referred to the criticisims by the Toronto Council of the Act providing for the establishment of a Central Board of Health, passed by the Parliament of the United Canadas in April, 1849. Its provisions are those in many instances which are contained in the consolidated Public Health Act of 1887.

It provided that wherever the Province or any part thereof is seriously threatened with an outbreak of any contagious disease, the Governor may by proclamation declare the Act to be in force in the whole Province or in any part thereof. It was an amendment to the Act passed in the 5th year of William the Fourth.

Under this Act the Governor could, by commission, appoint a Central Board of Health.

Sect. IV empowers the Central Board to require the Mayor, Reeve, etc., of any municipality to call special meetings and appoint a Local Board of Health. If, after petition of ten or more ratepayers stating that such council has refused to make such appointment, it shall be lawful for His Excellency in Council forthwith to appoint not less than three persons to be called "The Local Board of Health."

Sect. V.—Provided that any three or more members of the Central Board could issue such regulations as they deemed proper for the prevention or mitigation as far as possible of such epidemic or contagious disease, and said Board could authorize and require the Local Board to superintend and see to the execution of the said regulations for dispensing medicines and for affording aid to the affected and to those threatened. Local Boards were further empowered to remove the sick from any unhealthy dwelling to tents, etc.

Sect, VI.—Provided for two or more Health Officers entering at all reasonable times on premises, and if necessary calling to their aid constables to enforce removals therefrom.

Sec. VII.—Provided that the expenses of the Central Board be defrayed out of moneys voted by the Provincial Parliament for this purpose, and the expenses of Local Boards to be defrayed by the municipality.

Sec. VIII — During the period while the proclamation was in force all municipal health regulations were suspended.

Sec. IX.—Provided a penalty of £5 for violation of the regulations.

Sec. X.—Provided that no order nor any other proceeding, matter or thing done or transacted in, or relating to the execution of this Act shall be vacated, quashed or set aside for want of form, or be removed or revocable by *certiorari* or other writ or provision whatsoever into any of the Superior Courts in this Province.

With the advent of the autumn, cholera disappeared from the Province and did not reappear until 1854, its prevalence along the valley of the Mississippi and in Great Britain in 1848, made its re-appearance in 1849 to be feared, and the Province seems to have been fairly well prepared for it.

A proclamation establishing under the Act of 1849 a central Board of Health, is dated Quebec, 20th July, 1854, declaring said Act of 1849 to be in force in the Province, and to continue in force for and during the period of six calendar months. Signed *Elgin* and *Kincardine*.

Under it the Central Board issued Regulations dated at Quebec, 20th July.

They were contained in two chapters :—

Chapter I. contained general and personal directions to families and individuals and treated of (1) cleaning of premises, (2) keeping cellars clean and dry, (3) houses to be aired by chimney boards and stoppers being removed, (4) doors to be left open day and night, (5) bedding to be aired daily, (6) personal cleanliness by tepid bath two or three times weekly, (7) flannel vests to be worn next to skin, (8) general moderation in eating and drinking, diet light and nourishing, mainly of animal food, while fish and vegetables were to be used sparingly and green cooked vegetables, as peas, beans and cabbage to be avoided, (9) those who from principle objected to the use of spirituous or fermented drinks were recommended to take tea or toast water at meals, while those accustomed to use liquors were to use them in small quantities and of the best quality, (10) long fastings and late suppers to be carefully avoided, (11) soda water as a summer drink was recommended, (12) recommended that the sick should not be attended by more persons than absolutely necessary, thereby lessening crowding and so helping the patients while lessening the danger to the public, (13) warned the public against indiscriminate use of mineral waters and especially against the use of the many kinds of patent medicines so extensively employed, (14) recommended burning, baking and boiling of clothes, and 1 to 4 parts of cloride of lime, (15) advised against unnecessary alarm.

Successive sections advised Local Boards to pay special attention to unsound meat, to cellars, cesspools, privies, etc., stagnant pools, pig-pens, slaughter-houses and butcher stalls, skins, hides and tanneries.

Sec. XVII.—"And no interment shall be permitted within the walls of a church, or the limits of any city or town; crowding grave-yards was forbidden, and the opening of vaults having had recent interments was to be done with the utmost caution."

Undertakers, hotels and boarding-houses were most strictly regulated, and all burials were to be private and within 24 hours.

All ship captains had to report deaths on board, and Local Boards were requested to report weekly to the Central Board.

These precautions seem to have been fairly well observed, as the epidemic did not reach the proportions of previous ones.

The City of Hamilton, suffered, however, severely, a very notable number of deaths having occurred. On the 19th of July, 23 deaths occurred in Hamilton, while about the same time 56 deaths occurred daily in Montreal, while by 1st of August 832 deaths had occurred in Montreal. Domiciliary visits were then carried out regularly, and people under penalty were required to report cases. Cholera was very prevalent this year in St. John, New Brunswick.

On August 26th, 23 deaths occurred in Hamilton Hospital alone.

The Toronto *Leader*, August 20th, says: "The health of the city is improving daily. The number of cholera patients admitted to hospital during the past week does not amount to more than a quarter of the number of previous week. The cemeteries report the same decrease."

The *Leader* editorially stated, August 22nd, that cholera had nearly disappeared in Upper Canada and remarked that the disease really is a punishment for being filthy, and a council must be vested with full power of action.

"If a judicious expenditure of £1,000 had been made last spring by the corporation in removing nuisances, it is probable that one half-the persons who have fallen victims to cholera in this city would now be living."

"Will the lessons be turned to practical use in the future.?"

"Some of our civic rulers persisted in ignoring the existence of cholera for a whole month after its appearance, and the grossest and most inhuman neglect of the suffering and dying took place." "No place was provided for the patients for weeks." On August 27th there were 2 admissions into the Cholera Hospital, and 27 inmates at the time.

The epidemic of 1854 was practically the last outbreak of cholera in Ontario.

Cholera having appeared in Europe in 1865, created apprehensions lest it should reach Canada in 1866.

April 1866 saw the Central Board of Health appointed by the Governor, the seat of government being then held at Ottawa.

The *Globe* of May 7th says in its New York telegrams: "Two more cases of cholera (one before) have appeared," and on May 8th published the regulations adopted by the Central Board of Health under Sec. 5. Cap. 38, Consolidated Statutes of Canada, and gazetted May 3rd. These regulations consisted of 19 sections containing provisions very similar to those quoted from preceding regulations.

These regulations produced sanitary activity throughout the Province. On May 11th Dr. Tempest was appointed by the city Board of Health of Toronto, Medical Health Officer. Reference is made to a paper delivered by him before the medical section of the Canadian Institute on cholera, in which I find the first mention of its zymotic character. He assumed it was of the class of "zymotic diseases and multiplied in the system."

Letters in newspapers referred to the dangers due to the sewers crudely constructed giving forth into the streets their poisonous gases.

The regulations provide that the mail steamers be boarded at Father Point and inspected, and if free from infection given *pratique* up the river.

All infected vessels had to stop at Grosse Isle or in the St. Charles at Quebec.

The sanitary activity then shown is seen in Ottawa where two Medical Health Officers, Drs. Van Courtland and St. Jean were appointed for six months at salaries of $500 each.

The disease prevailed to some extent in New York all summer, ten fresh cases being reported as late as September 13th; but while cholera ships occasionally reached Canadian ports as Halifax and Grosse Isle, the disease does not seem to have reached Ontario.*

Regarding this epidemic the *London Times* stated that it differed from previous ones, in that while they moved in definite directions, and with a steady progress, this one lingered at different ports as Rotterdam, here and there in England, and only in Paris and Madrid did it take on its old-time virulence.

The last cholera scare comes within our own period 1884 and 1885, but no cases of the disease reached Canada. Only once in the last ten years, viz., September 1887, has cholera reached New York, and that in the steamer *Alesia*.

To modern sanitarians accustomed to seeing Boards of Health permanent y established and pursuing their work systematically in the field of preventive medicine, the spasmodic activity in health matters developed in these early years of the century seems crude, and with results proportionately imperfect; but they have to confess that in too many instances the national memory and health conscience, and still more perhaps the municipal, have by no means arrived at that exalted position which can allow them to adopt the old motto *semper paratus in armis*.

After all, this deadening of the health-conscience and loss of memory of what conditions disease is but another illustration of a phase in the French Revolution, regarding which

* I have been informed by a daughter of Dr. Tempest that one case, which died, occurred in Toronto.

Carlyle says: "Seldom do we find that a whole people can be said to have any faith at all, except in things which it can eat and drink; whensoever it gets any faith, its history becomes spirit-stirring, noteworthy." This in health matters seems only to happen in the midst of death-dealing epidemics. Then and then alone can people be seriously said to have a health-conscience.

That this health-conscience has from time to time been aroused in Canada, we have already pointed out: that its absence has sometimes illustrated Horatio's remark to Hamlet, "Custom hath made it in him a property of easiness," is unfortunately equally true.

I may then briefly review the occasions when as shown by Health Acts the health-conscience of Canada became more or less strongly aroused.

It will be remembered, that at the period of the cession of Canada to Britain, the Province of Quebec was the only portion of Canada proper which had an organized government. The Act passed by the Imperial House of Commons in 1774, intituled "An Act for making more effective provision for the government of the Province of Quebec, in North America, and to make further provision for the government of said Province," contained sundry provisions, which were amended in the Provincial Statutes of Lower Canada in 1795 in an "An Act to oblige ships and vessels coming from places infected with the plague or any pestilential fever or disease, to perform quarantine and prevent the communication thereof in the Province."

This Act provided for vessels coming into the St. Lawrence to perform *quarantine* "and remain at such part of said River St. Lawrence or the lands adjoining thereto or islands in the said River, and for such time as may be judged requisite to prevent the communication of diseases that may endanger the lives of His Majesty's subjects."

The second section of this Act of 1794 says, that whenever owing to the presence of pestilential disease, the Lieutenant-Governor shall see quarantine duly performed, and this Act carried into execution by causing any person so authorized to go off to any ship within 60 leagues of Quebec and demand an account from the commander who shall state the place or places where the cargo was taken on board and whether such place or places were infected with the plague or other disease, and how many persons were on board when the ship sailed, and how many died during the voyage; and if the officer thinks fit such ship shall repair to the place designated; and in case such master of a ship shall conceal the facts, such commander shall be guilty of felony, and shall suffer death as in cases of felony without benefit of clergy."

Section III. of the same Act authorizes the appointment of a physician to go on board any such vessel to make strict search, examination and enquiry into the health, state and condition of the matter, passengers and marines, and to report thereon without delay to the government.

Section IV. provides for the levying of a fine not exceeding £300 on any commander who allows passengers or mariners to leave such quarantined vessel.

Section X. provides that where such ship is reported free from infection, the Lieutenant-Governor shall give the commander a passport.

This Act was practically that which remained in force till the Act passed by the parliament of Upper Canada on February 13th, 1833, the year after the first outbreak of cholera. We have already referred to the prompt steps taken in the summer of 1832 by the Lieutenant-Governor, which action was approved of by the House, when this Act was passed intituled "An Act to establish Boards of Health and to guard against the introduction of malignant, contagious and infectious diseases in this Province."

The preamble refers to the repeal of certain parts of an Act passed in the 14th year of His Majesty's reign, and thereafter states "That it shall and may be lawful for the Governor, Lieutenant-Governor or person administering the government, to appoint three or more persons in each and every town in this Province, and in such other places as may be deemed necessary to act as health officers within their respective limits.

The Act contained, amongst other provisions, powers stating that:—

1. The Health Officers could enter in and upon premises and order them to be cleaned.

2. That the Governor in Council may make rules concerning the entry and departure of vessels, and the landing of passengers.

3. It provided a penalty of 20 shillings for the violation of any rules or regulations of the Board or obstructing its officers.

4. It finally stated that this Act shall be and continue in force for one year, and from thence to the end of the next ensuing session of the Provincial Parliament and no longer.

From what has already been stated it will appear that Canada was in the van in the good work of establishing Boards of Health and that as far as power to organize and carry on health work, our present most complete Public Health Act, cannot be said to be any advance on this.

Perhaps it may be fairly said that, considering the greatly increased knowledge of the causes of disease existing in the present day, executive control of the public health is not more advanced than then, except in the one most important matter of permanent organization.

Having been fortunate in obtaining details of the cholera outbreak in Toronto in 1849, I append here the study of them, along with the meteorological data, as appeared in the weekly bulletin of the Board published in July, 1884.

Through the great kindness of Mr. Stewart, of the Toronto Meteorological Observatory, I have been supplied with a record, not only of the cases of cholera and the deaths therefrom which occurred during the outbreak in Toronto in 1849, but also with the principal meteorological conditions during the outbreak. The opportunity of obtaining such a treasure of scientific information of nearly 40 years ago in Ontario is so rare that no excuse is necessary for introducing some of the facts, with some inferences into this bulletin. The first reported case occurred on the 6th of July, with a temperature of 72.5°, or 1.6° below the average, but with a relative humidity 12% greater than the average (a low temperature and abnormal humidity existed for four days preceding the outbreak). The case proved fatal the same day. From the table (found below) the weekly conditions indicate, in some cases very markedly, successive important differences in weather conditions; but in many instances the changes which seemed to have influenced the disease are not coincident with the weeks. Some of these will be noticed. On the 9th of July the daily average temperature stood 4.2° above the average, with humidity 11% greater than the average. After two days with no cases, four are reported on the 10th. From the 9th to the 13th there was a steady increase both in temperature and humidity, amounting to 9.3° of the former, and 13% of the latter. Seven cases were reported on the 13th. The temperature changing on the 14th, falls from 88.6° on the 14th to 67.4° on the 15th. It remains cool for four days, but the upward wave of disease, started by the hot weather, as seen on the 13th, with 7 cases, was followed by 10, 19, 16, 13 on the successive cool days. On the 18th the temperature begins to rise again, but the influence of the four cool days has set in, so that for the next three days of increasing temperature we have a decreasing number of cases. With these days, as in the previous hot term, the relative humidity increased much above the average. Five more cool days, from the 21st to the 25th, with a temperature in all, except one, below the average, are accompanied with an increase of cases, always growing less during the last one or two cool days. No particularly marked periods occur, and no marked variations in the number of cases is seen till August the 10th, when a cool period sets in, lasting till the 18th. In the last four days of this period the number of cases notably decreases. An interesting point in this cool term is that the relative humidity is from 5% to 17% above the average, whereas it is greatest in July during the hot periods. On the 18th the temperature increases till it is above the average, and so ranges till the 27th. Humidity was markedly above the average with this heated term. There is after the first day a marked increase of the disease, reaching on the 23rd to 30 cases and 11 deaths. This dates the height of the epidemic. The first three days of September, which, though cool, followed July 31st with a temperature of 76.8° and 14 deaths, have more than 10 cases each day; but after the 3rd of September no day has more than 10 cases, and the disease, with slight daily fluctuations, wears away till the 20th September, after which no cases are reported.

What are some of the inferences drawn from the records?

1. That every term with a temperature above the average was accompanied with a humidity above the average.

2. That every term with temperature below the average, with the exception of one, had no excessive humidity.

3. That after three or four days of increased heat, the number of cases increased, and continued to increase for several days of a succeeding cooler term.

4. Every cool term ended with a decline in the number of cases.

5. Excessive humidity without increased heat was not sufficient to cause an increase of cases.

6. The moment the temperature falls below 70° there is an associated decrease in the number of cases; and when it rises above this there is an increase in the number of cases. This is admirably seen in September, when, after a cool term of four days, the number of cases falls to 2 on the 6th; but the 5th and 6th have temperatures above 70°, and, although on the 8th we have the temperature falling to 58°, the cases have increased to 8, steadily falling again with the cold to 1 on the 11th.

7. Apparently the cholera *microbe* requires a temperature above 70° for its free development, which development is aided by increased temperature up to at least as high as 90°.

8. That successive humidity, with heat, is favorable to its free development.

9. That it takes several days of favorable conditions to develop an abundant crop of *microbes*.

10. That high temperatures, with excessive humidity, are the conditions favorable for all organic decomposition, and abundant *bacterial* life.

11. That, apparently, from the mortality during the first two weeks of September, cold makes the cases more fatal; and that the anomaly in the last week simply indicates that with the wearing out of the disease the cases became more like severe diarrhœa.

It would appear, from an examination of the table, that for the period during which the epidemic prevailed in Toronto there were 769 cases of cholera, out of which number 464 cases terminated fatally. The result for the different months would appear to be as follows:

	Day.	Cases.	Deaths	Cases per day.	Death per day	Ratio.
July	26	225	138	8.66	5.31	0.61
Aug.	31	445	261	14.35	8.42	0.59
Sept.	20	99	65	4.95	3.25	0.66

Subdividing the total period into the ordinary week, we have the following result, which may be interesting in comparison with some of the Meteorological elements for the same periods:

Weeks Ending.	Number of cases recorded.	Number of deaths.	Ratio of death to cases.	Average highest temperature for week.	Average lowest temperature for week.	Mean daily range.	Mean temperature of week, higher or lower than average.	Mean humidity of air, higher than average.
								per c.
July 7	4	2	0.50	72.8	53.6	19.2	−0.26	− 9
" 14	27	17	.65	83.8	63.1	20.7	+5.17	+12
" 21	80	48	.60	75.3	57.2	18.1	−1.89	− 7
" 28	80	48	.60	74.5	56.1	18.4	−2.36	− 6
Aug. 4	101	57	.56	72.4	52.8	19.6	−2.92	− 7
" 11	91	58	.64	72.2	55.7	16.5	−3.62	− 5
" 18	74	41	.60	71.6	54.4	17.2	−2.29	+ 9
" 25	121	77	.64	75.7	58.4	17.3	−2.33	+ 9
Sept. 1	104	56	.54	73.1	56.2	16.9	−2.61	−10
" 8	55	37	.67	66.3	51.3	15.0	1.23	− 9
" 15	23	18	.78	65.6	49.5	16.1	−0.59	− 11
" 20	9	2	.22	68.9	52.1	16.8	−0.83	+ 1

The following most interesting history of the importation of contagious diseases into Canada by way of the St. Lawrence has been supplied through the kindness of Dr. F. Montizambert, the Superintendent of the Dominion Quarantine Service of the St. Lawrence:

Quarantine Station, Grosse Isle.

Hospital Returns for the Sixty years 1832-1891.

Year.	Number inspected Port of Quebec.	Admissions.									Deaths.							
		Total.	Cholera.	Fever.	Smallpox.	Scarlet fever.	Measles.	Dysentery and Diarrhœa.	Other diseases.	Cholera.	Fever.	Smallpox.	Scarlet fever.	Measles.	Dysentery and Diarrhœa.	Other diseases.	Total.
1832	51766	....	....	(No Hospital records for this year are discoverable.)													
1833	21732	239	....	159	34	....	....	....	46	....	(No details discoverable).						27
1834	30935	844	290	401	12	....	29	27	82	159	68	2	....	12	19	4	264
1835	12527	126	....	26	47	....	30	12	11	....	....	6	....	2	2	....	10
1836	27728	452	....	334	48	4	11	6	19	....	39	3	1	11	3	4	62
1837	21902	598	....	481	104	....	9	4	....	....	44	10	....	3	....	....	57
1838	3266	61	....	24	17	5	....	3	16	....	3	....	1	....	....	2	6
1839	7439	189	....	159	1	....	22	....	16	....	6	....	....	2	....	1	9
1840	22234	561	....	485	60	....	9	....	7	....	31	10	....	1	....	2	44
1841	28086	290	....	184	32	4	61	....	9	....	21	2	1	17	....	2	43
1842	41374	488	....	311	77	2	51	2	15	....	42	6	....	4	....	2	54
1843	21727	246	....	174	26	1	35	1	9	....	12	2	....	2	1	2	19
1844	20142	388	....	322	11	13	37	....	5	....	12	1	2	1	....	2	18
1845	25375	463	....	362	73	....	28	....	2	....	21	5	....	4	....	....	30
1846	32753	892	....	679	106	....	93	....	14	....	50	9	....	31	....	5	67
1847*	98106	8691	....	8639	52	....	....	....	....	....	3226	12	....	....	....	....	3238

* 1847. Deaths in hospital, 3,226; interments, 5,424. The difference is made up of those who died on vessels in quarantine, or upon landing, but before they could be entered in the hospital books.

QUARANTINE STATION, GROSS ISLE.—*Continued.*

YEAR.	Number inspected Port of Quebec.	ADMISSIONS.								DEATHS.						
		Total.	Cholera.	Fever.	Smallpox.	Scarlet fever.	Measles.	Dysentery and Diarrhœa.	Other diseases.	Cholera.	Fever.	Smallpox.	Scarlet fever.	Measles.	Dysentery and Diarrhœa.	Other diseases.	Total.
1848	27939	581	....	302	31	...	18	154	76	....	53	1	....	7	37	29	127
1849	38494	859	3	605	34	1	42	111	63	56	46	6	...	3	35	14	160
1850	32292	359	....	224	38	...	5	31	61	....	13	2	...	1	4	4	24
1851	41076	594	....	179	87	1	116	36	174	....	11	5	1	12	15	10	54
1852	39176	287	....	64	47	9	58	15	94	....	5	....	....	5	2	6	18
1853	36699	278	....	49	31	....	36	27	135	....	6	1	....	7	8	10	32
1854	53180	690	14	39	133	6	164	55	279	8	7	6	5	16	5	18	65
1855	21274	232	....	107	106	....	19	22	178	....	5	5	....	5	4	16	35
1856	22439	263	....	33	8	9	61	10	142	...	3	....	2	7	....	8	20
1857	32097	117	....	62	4	30	115	12	694	...	12	1	2	12	5	5	37
1858	12810	227	....	17	3	6	75	7	119	....	1	....	2	12	2	4	21
1859	8778	92	....	20	22	..	..	....	50	....	....	....	....	....	....	....	....
1860	10150	92	....	16	26	....	....	1	49	....	1	5	....	....	....	4	10
1861	19923	341	....	14	103	....	66	21	137	....	2	8	....	11	3	1	25
1862	22176	367	....	151	47	....	37	25	107	....	34	7	....	8	9	..	58
1863	19419	44	....	17	1	....	....	....	26	..	1	....	....	....	....	....	1
1864	19147	60	....	31	8	1	..	....	20	....	2	3	1	....	3	....	9
1865	21355	33	....	..	5	....	1	6	21	....	....	....	....	....	3	....	3
1866	28648	271	....	23	15	....	67	..	166	....	6	....	....	6	....	11	23
1867	30757	375	....	33	65	....	42	58	177	....	7	3	....	2	8	4	24
1868	34300	424	....	10	19	2	143	....	248	....	....	1	....	22	....	5	28
1869	43114	494	....	139	50	10	68	....	227	....	27	1	2	8	....	6	44
1870	44475	392	....	1	50	..	175	13	153	....	....	2	....	....	1	3	6
1871	37020	267	....	10	34	27	35	17	144	....	....	....	3	....	2	2	7
1872	34743	309	....	38	77	8	45	26	115	....	....	9	....	5	1	5	20
1873	36901	114	....	4	15	....	36	3	56	....	....	....	....	4	....	....	4
1874	23891	62	....	2	....	....	22	3	35	....	1	....	....	2	....	..	3
1875	16038	70	....	2	....	....	29	1	38	....	....	....	....	2	....	....	2
1876	10900	1	....	..	1	....	....	....	....	....	....	....	....	....	....	....	....
1877	7743	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1878	10295	7	....	1	....	....	....	....	6	....	....	....	....	....	....	....	....
1879	17251	7	....	6	....	....	....	....	1	....	....	....	....	....	....	....	....
1880	24997	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1881	30238	....	..	..	....	....	..	....	....	....	....	....	....	....	....	....	....
1882	44850	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1883	45966	1	....	1	....	....	....	....	....	..	....	....	..	....	....	....	....
1884	31529	2	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....
1885	17035	6	....	..	6	....	....	....	....	....	....	....	....	....	....	....	1
1886	22782	13	....	2	5	....	....	....	6	....	1	2	....	....	..	....	3
1887	32749	76	...	9	....	3	25	6	27	....	1	....	....	....	3	....	4
1888	37721	54	....	6	1	1	13	4	29	....	1	....	....	....	....	1	2
1889	27571	33	....	3	1	....	16	....	13	....	....	....	....	....	....	....	....
1890	27447	51	..	2	5	1	10	1	32	....	....	....	....	1	....	....	1
1891	33021	59	....	3	3	1	16	....	36	....	1	....	....	....	....	....	1

[1] 1866. Present Medical Superintendent joined Quarantine staff.

"Number inspected." does not include the crews, but passengers only.

The old division of diseases here has been followed out.

"Fever" means principally Typhus Fever, but also includes occasional cases of Yellow Fever, Relapsing Fever and Enteric Fever.

"Other diseases" include Diphtheria, Chicken-pox, etc., etc.

F. MONTIZAMBERT, M.D., F.R.C.S., D.C.L.,
Medical Superintendent St. Lawrence Quarantine Service.

NOTE.—It will be noticed that in 1849 there were 3 admissions for Cholera and 56 deaths, showing presumably its spread in the wards. The unusual number of admissions and deaths from "Dysentery and Diarrhœa" in 1849 and 1850 is also what one would expect at such a time.

I am very sorry that no "Hospital Returns" for 1832 are to be found. It was an entirely *military* station that year its first), and I presume the records, if any would be only with the regimental records.—F.M.

CHAPTER II.

TEN YEARS OF PUBLIC HEALTH WORK IN ONTARIO.

In the preceding chapter there have been briefly set forth some of the chief facts relating to the public health during the era preceding the establishment of permanent Provincial and Local Boards of Health in Ontario. I now purpose referring to some of the principal matters which have occupied the attention of health authorities both Central and Local since the establishment of the Provincial Board in 1882.

The following classification may be said to include the principal classes of subjects which the Provincial Board has especially given its attention to; and which may be said, so far as this Province is concerned, to cover the work which to the Provincial Board of Health has seemed to come within the scope of the work which it was especially organized to carry out.

1. MACHINERY OF PUBLIC HEALTH WORK.
    1. Provincial Board of Health.
    2. Local Boards of Health.
    3. Association of Executive Health Officers.
    4. Councils.
    5. Boards of Trade.
    6. Citizens' Committees.

2. COLLECTION OF SANITARY INFORMATION.
    1. Reports of Disease by Physicians and Local Boards.
    2. Annual Reports of the Local Boards.
    3. Communications from Local Boards and individuals.
    4. Investigations by Committees of the Board and its Officers.
    5. Reports of Foreign Health Boards.

3. DISSEMINATION OF SANITARY INFORMATION.
    1. Bulletins of the Board.
    2. Annual Reports of the Board.
    3. Sanitary Conventions and reports thereof.
    4. Communications with Local Boards and individuals.
    5. Special Investigations in different localities.

4. HEALTH LEGISLATION.
    1. Act of Establishment of the Provincial Board of Health 1882.
    2. Public Health Act of 1884.
    3. Amendment of 1885 to the Health Act.
    4. Amendment of 1886 to the Health Act.
    5. Amendment of 1887 to the Health Act.
    6. Amendment of 1889 to the Health Act.
    7. Amendment of 1890 to the Health Act.
    8. Amendment of 1891 to the Health Act.
    9. Municipal and other special Acts referring to health matters.
    10. Quarantine Laws of Canada.
    11. Inter-provincial and inter-state agreements, regarding notification of outbreaks of disease.

5. Investigations into Causes of Disease.

1. Waste organic matter.
2. Destruction of refuse.
3. Disposal of sewage.
4. Sewerage systems.
5. Sub soil drainage.
6. Mill-dams, mill-ponds. and drowned lands.

6. Outbreaks of Disease.

1. Classes of outbreaks.
2. Vaccination.
3. Isolation hospitals.
4. National quarantine system.
5. Inter-state notification.
6. Laws relating to outbreaks.

7. Food and Drink Supplies.

1. Water supplies.
2. Milk supplies.
3. Meat Supplies.
4. Flour and other foods.
5. Laws to regulate the same.

8. School Hygiene.

1. Inspection of schools.
2. Construction, ventilation and drainage of schools.
3. Vaccination of school children.
4. Laws regarding infectious diseases in schools.

9. Public Institutions.

1. Outbreaks of disease therein.
2. Sanitary condition of public institutions.
3. Disposal of sewage in same.

In addition to the preceding subjects dealt with in the report proper of the Board, the following list presents a *resume* of the reports, addresses, etc., presented to the Board by its committees, or which have been delivered by its members at sanitary conferences or public meetings to discuss health matters.

1882.

Report of Committee to England *re* Sanitary Matters.
Report of the Committee to Boston, New York and Albany.
Report of Delegate to the International Congress of Hygiene to Geneva.
Report of Committee sent to visit Michigan, Detroit and Toledo Boards of Health.
Circular to Clerks of Municipalities asking for information regarding disease, etc.
Circular to Physicians.
Pamphlet on "How to Check Contagious and Infectious Diseases."
Treatment of the drowned.
Report of the Commission to investigate typhoid at Sarnia.
Report of Commission to investigate malaria at Coboconk and Madoc.
Report of Commission to investigate typhoid at Chatham.
Report of Commission to investigate typhoid at Lambton Mills.
Report regarding water supply and disposal of sewage of Toronto.
Report of Committee on emigrant inspection.
Report of Committee on disease reports.
Report of the Committee on legislation.

Addresses, etc.

By Chairman.
On Food Adulteration.
Contamination of Drinking Water.
Contagion.
Public Schools and Public Health.
Prevention and Restriction of Contagious Diseases.
Sewerage as a Sanitary Measure.
Heating and Ventilating of Buildings.
Typhoid and other Zymotics and how to Prevent them.
School Sanitation : Its Necessity and Methods.

1883

Summer Resort for Children.
American Public Health Association at Detroit.
Report of Committee of Ontario Medical Association *re* Public Health, Vital Statistics, etc.
Directions *re* Asiatic Cholera..
On Disposal of Sewage.
Report of Leslieville knackery and fat-rendering establishment.
Report on condition of Ashbridge's Bay.
Report on the smoke nuisance in Toronto.
Report *re* saw dust at Parry Sound.
Re a text-book on Hygiene for schools.
Medical inspection of schools.
Sanitary arrangements and health conditions of Hamilton schools.
Report of the London Sanitary Convention.
Paper read before the Hamilton Literary Association.

1884.

The Public Health Act.

1885.

Report on poisons and chemicals.
Report of the London sewage investigation Committee.
Report of the Committee on epidemics.
Report on typhoid fever at Kingston Asylum.
Report on the establishment of the Vaccine Farm.
Report *re* Infanticide.
Report *re* the sewerage system of Woodstock.
Report on Maritime and Land sanitation.
Report *re* the inspection of cemeteries.
Report of the St. Mary's cemetery.

1886.

Health notes of a trip in Britain.
Report *re* abattoirs and slaughter houses.
Report *re* nuisances arising from cheese factories, etc.
Report of Committee on food and drinks and ice supplies.
Report of Committee on sewerage *re* Stratford and other towns.
Report *re* starch factory nuisance at Brantford.

1887.

Report *re* the quarantine station at Grosse Isle.
Report *re* anthrax at Guelph.
Report *re* outbreak of diphtheria in Nipissing District.
Report *re* Ottawa fever outbreak.
Report *re* sewer nuisance at Hamilton.
Report *re* water supply for Belleville.
Report *re* Berlin and Brantford water-works.
Report *re* foods and adulterations, and public milk supplies.
Report *re* ventilation.
Report *re* poisons.
Report *re* grounds for cemetery at Bradford.
Report *re* International Conference of State Boards of Health.
Report *re* meeting of the American Public Health Association.

1888.

Report *re* school hygiene.
Report *re* quarantine.

1889.

Report *re* small-pox in Elgin County.
Report *re* disease amongst horses at Sanford.
Report *re* disposal of sewage in England.
Report *re* sewage and water supply on farm at London Asylum.
Report *re* porous carbon system (sewerage) at Agricultural College.
Report *re* poisons.
Report *re* a fat-rendering and hog-feeding establishment in East Zorra.
Report *re* Union schools at Simcoe, County Norfolk.

1890.

Report *re* sanitary progress in Britain and on the continent.
Report *re* physical culture in Normal, Model and Public Schools.
Report *re* sewerage system for Brantford.
Report *re* Conder system of sewerage at Belleville Institute.
Report *re* flooding of land along South River.
Report *re* public water supply of Orillia.
Report *re* Beaverton mill-dam nuisance.
Report *re* diphtheria at Kingston Asylum.

It will be of interest to refer very briefly to some of these subjects and to set forth what seem to be the conclusions which may be drawn regarding them after an experience of ten years of public health work.

Public Health Legislation and Machinery of Public Health Work.

At the organization of the Provincial Board in 1882 there existed in the Province, as already has been noticed in Chapter I, various public health enactments, which may be said to have been consolidated in Cap. 190, R. S. O. 1887. Under this old Act the provision was made whereby the municipal council of every city, town, village and township shall be *de jure* health officers, while these might delegate their powers to a committee of their own number or to such other persons as the council thought best.

Various sections of the Act gave to these committees extended powers for dealing with public health matters.

Under the same Act, the Lieutenant Governor had power to organise a Central Board of Health for such time as might be fixed by Order in Council, and to have power to appoint Local Boards wherever the mayor and council had failed under the Order in Council to appoint three persons as a Local Board of Health in lieu of the committee of the council.

This Act is practically that passed in 1849, when fears, unfortunately too fatally realised, existed of the introduction of cholera into Canada.

Such a Central Board was formed in that year, in 1854 and in 1866 all of which were cholera years.

The Provincial Board in order that it might carry out its work, then almost wholly of an advisory character, sent out circulars in 1882 and 1883 requesting municipal councils to inform it whether such committees of health, as provided under this Act, existed, and if not, urging them to make such appointments.

The report for 1882 says in regard to this: "We regret to say that the replies were not as numerous as they should have been. This seems to have been in some cases due to neglect on the part of of the clerks to present the documents to the council."

This work of urging the formation of Local Boards was pushed in 1883 as far as possible with the result, set forth on page xxix of the Report for that year, as follows:—

Local Boards in existence in the forty Counties	50
Counties with no Boards	12
Counties with one Board	15
Counties with two Boards	6
Counties with three Boards	3
Counties with four Boards	1
Counties with five Boards	2
Boards with Sanitary Inspectors or Health Officers	2(one salaried.)
Medical Health Officers	4
Medical men on Board	3
Boards with three salaried members	1

Such a showing was not encouraging, and the Provincial Board felt after two years' experience, that if its operations were to be of that practical value which the interests of the public health demanded, legislation, based upon some principle of compulsion, was urgently required. There seems to be little doubt but that these two years of missionary work had been of much value in spreading abroad the knowledge of the needs of public health work, and of creating on the part of very many a demand for some more organised and positive methods by which the Central Boards could require the establishment of Local Boards, and to some extent insist on their performing public health work.

To this end what is now known as the Public Health Act, was prepared with the approval of the Government, and after much discussion in the Legislature and out of it, the bill with sundry amendments became law. Under this law the formation of Local Boards of Health by the appointment of a definite number of ratepayers became compulsory on the part of Councils, or on their failing to appoint, on the part of the Provincial Board of Health. (*Vide* Sec. 39. Cap. 205, R.S.O., 1887).

That the effects of this Act was to give a great impetus to public health work may be gathered from the fact that during the half year of 1885, after the Act came into force, there were formed in the 447 townships 184 Local Boards; while in the 203 cities, towns and villages in Ontario 180 Local Boards were organised. In the townships there were also appointed 25 medical health officers, and 19 others appointed sanitary inspectors, while 17 Boards appointed both. Of the city, town and village Boards 155 appointed either a medical health officer or sanitary inspector, 63 having medical health officers, and 92 sanitary inspectors, and 44 Boards appointed both classes of officers.

This impetus to sanitary work was doubtless accentuated by the outbreak of a very serious epidemic of small-pox in Hungerford and the adjoining townships.

The value of organisation was, however, immediately seen and realised by the Province: for although 150 persons had been infected before knowledge of the nature of the

outbreak, or its extent had become known to the Provincial Board, prompt action in organisation had the effect of limiting the epidemic to 203 persons in the townships and stamping it out within two months.

The existence of cholera at Toulon and Marseilles in the Mediterranean, and fears of its appearance in America in 1885 had the effect of urging the Board to still more strenuous exertions in organisation, and it succeeded in having certain defects of the new law removed by an amendment of the Act (*vide* sect. 31, *et seq.* cap. 205, R. S. O., 1887), giving the Provincial Board power to require Local Boards to appoint medical health officers within five days after request in cases where there is reason to fear the advent of formidable contagious disease.

This amendment and the duties laid upon such officers by the Act were such as to associate with the Provincial Board of Health an active organisation of medically trained officers, extending throughout the whole Province, and ready at a moment's warning to set the whole public health machinery in motion. The opportuneness of this amendment could in no way have been better illustrated than by the events of the year 1885, which became memorable in the annals of the Board, as that of the Montreal small-pox epidemic.

During the early part of the year several isolated cases of small-pox had occurred in Ontario, a few in Hungerford, and one or two other eastern localities. The organisation of Local Boards was urged forward in view of these facts, but especially on account of the growing frequency of cases of the same disease in Montreal, where during these months 22 deaths occurred.

These outbreaks caused the issue of a vaccination circular on May 16th, and in June the following additional circular was sent out :—

OFFICE, PROVINCIAL BOARD OF HEALTH,

TORONTO, June 10th, 1892.

To..... .....Municipal Clerk.

DEAR SIR,—In view of the widespread existence of small-pox in Montreal and the imminent danger there is of an epidemic of the disease occurring therefrom in this Province, I would request you, in conformity with Sections 2 and 3, Public Health Act, 1885, to at once—*within five days*—report the appointment by the Council of your municipality of a Medical Health Officer, who shall be prepared to vaccinate and take such other prophylactic measures as will be most likely to limit the disease, should it make its appearance in your locality.

I have the honor to be,
Your obedient servant,

P. H. BRYCE,
Secretary.

N. B.—Should the Council not have already complied with the provisions of Section 12, Public Health Act, 1884, they will, I trust, do so without delay, in order to thus avoid the disagreeable duty imposed upon this Board of carrying out the provisions of Section 19 of the Act.

The result of the first circular caused general municipal vaccination to be carried out in 100 districts.

The result of the second, with the epidemic in Montreal increasing, is seen in the fact that in some 600 municipalities, there were appointed 563 Local Boards, 283 Medical Health Officers, and 160 Sanitary Inspectors, with numerous vaccination officers.

This staff of local officers during the progress of the epidemic was assisted by the appointment of medical inspectors of the Provincial Board for all trains and lines of steamboats, by which passengers could come into the Province.

How efficient was the organisation is seen in the following extract from the report for 1885 :

"It must be evident from this exhibit that without any special centre of infection in the Province, similar to that of Montreal, or that of Hungerford last year, there were in 1872, 1873 and 1874, 775 cases of small-pox in twenty-nine counties of the Province with 371 deaths ; while with two such extended centres of infection as those referred to, in the Province during the same year, and with the means of communication between the different parts of the Province greatly facilitated by means of railways, there have been as already shown, only ten counties in which cases have occurred, while the total cases

during 1883, 1884 and 1885, in Ontario have been 250, and the total deaths, inclusive of those dying in Hungerford in 1885, from the outbreak at the end of 1884, have been but 84 deaths," and the further fact that of these deaths only 19 occurred in Ontario during the time of the Montreal epidemic, while it is calculated that there were nearly 7,000 deaths in the Province of Quebec during the same period. As the experience of 1885 indicated a few further additions to the Act, it was amended by provisions for the compulsory occupation of unoccupied premises for temporary use as an isolation hospital. (*Vide* Sec. 22 to 28, cap. 205, R. S. O., 1887.)

In addition to this amendment the Vaccination Act was amended during the same year, by which Local Boards of Health are empowered to carry out the powers given to municipal councils under the previous Act, in case after a month's notice the council has neglected to put into force the provisions of the Act. The amendment further provides for compulsory vaccination of persons every seven years in case the existence of small-pox in any municipality makes the same necessary in the opinion of the Provincial or Local Board of Health.

Trustees may also require children to present certificates of successful vaccination before admittance to the schools of the Province.

The events of the previous year might naturally have been expected to accentuate the progress of public health work, and that this was the case is seen not only in the above legislation, but in the fact that 610 Local Boards were appointed in 1886—the list of municipalities thereby being practically complete in the matter of organisation.

This year saw too, another important mark of rapid progress in Canadian sanitation. For almost 20 years from the time of the cholera in 1866, the St. Lawrence quarantine system had become inactive and inefficient, owing doubtless to the influence of the great steamship companies in the matter of rapid transit in competition with the New York steamship service.

With the experience of 1885, and the outbreak of small-pox on the Canadian Pacific Railway steamers on Lake Superior caused from some Russian immigrants who had left some of their sick at Grosse Isle, the Board, as also the newly-formed Provincial Board of Quebec were not in a humor to see small-pox again become epidemic through this or any other channel : and hence it was that the Provincial Board published its quarantine report, pointing out the urgent need of a remodelling of the quarantine system along lines most of which had been in vain urged for years with persistency by the Superintendent of the Grosse Isle Station.

It was therefore with pleasure that the Board and public were made acquainted with an Order-in-Council dated Ottawa August 7th, 1886, containing regulations, providing for efficient protection against the introduction of contagious disease *via* the St. Lawrence, in case its provisions were carried into effect.

The year is further notable as being the one in which the American Public Health Association held its annual meeting in Toronto, and during the session of which was organized the Association of Executive Health Officers, the work of which has been of the greatest advantage in unifying and consolidating public health work in the Province.

As will be seen by reference to the summary in the beginning of this chapter, the work of 1887 partook more of the features of what may be characterised as municipal sanitation. It was to be expected that with the experiences and lessons of previous years Local Boards would soon come to realise that true sanitation extends to the prevention of those diseases which are of a more domestic or endemic character. During the year 1886 diphtheria had appeared and extended its ravages in the Province causing deaths many times more numerous than those from small-pox at any time. In the five preceding years diphtheria had caused in Ontario 4,793 deaths, while in the single year, 1886, no less than 1,470 were recorded. This high death-rate caused Local Boards, as also the Provincial Board, to direct their attention to the special causes which tended to disseminate this pest. At the fourth quarterly meeting of the Provincial Board the subject was specially considered, and Regulations *re* Diphtheria were drafted for submission to and approval of the Government. They were not made an Order-in-Council, but Cap. 205, R. S. O., was amended (*vide* Sect. 9) so as to give the Provincial Board power to deal

directly with outbreaks of this and other diseases, by being empowered to require Local Boards to exercise "any of said powers, (of any Health Act) which in the opinion of the Provincial Board, the urgency of the case demands."

Legislation regarding this and other like diseases was further improved in the same year, by enactments (*vide* Sect. 94, Cap. 205, R. S. O.) intended to control the spread of the disease in the schools of the Province. The Local Boards require by these clauses to be informed by the teachers of such schools, and children are to be prevented from attending school till they and the households are certified by the medical health officer, free from contagion.

The regulation of ice supplies (*vide* Sec. 55, Cap. 205, R. S. O.) was further provided for, while the inspection of slaughter-houses, dairies, cheese-factories and creameries, was specially legislated upon, (*vide* Sect. 54 and 65, Cap. 205, R. S. O.) and various other sections of the Act were amended.

Power was also given (*vide* Sect. 109, Cap 205, R. S. O.) for any complainant in the matter of a grievance, where a Local Board of Health neglects its duty to apply to the courts under the Public Health Act for removal of the nuisance complained of.

The Provincial Board further, with a view to aiding Local Boards in their endeavors to improve the public milk supply, drew up a series of regulations by which Local Boards could regulate by license dairymen and milk-vendors, and suggested a common standard for the quality of milk.

These have been adopted by most of the cities and towns and have effected a marked improvement in this universal food

The matter of the destruction of town refuse was dealt with in the same report, and drawings of the most complete furnaces for the purpose were supplied.

In the year 1888 during an outbreak of small-pox spreading from Buffalo, the following Order-in-Council was passed: "That every Local Board of Health and its Medical Health Officer shall at once notify the Provincial Board of Health of all and any cases of cholera and small-pox, and such other outbreaks of diphtheria and scarlet-fever as occur within the limits of the jurisdiction of said Local Board." Owing to the prevalence of an epidemic of diphtheria in the frontier unorganised new settlements it was found that the Public Health Act had not made provision for prompt action in these districts owing to there being no municipal organisation. With a view to supplying power to deal with these outbreaks Cap. 42, 52 Vict. was passed by which the stipendiary magistrates of these districts have the power of Medical Health Officers under the Act, and the Provincial Board may from time to time appoint sanitary inspectors with powers given to the same under any Public Health Act; while constables appointed for any Provincial judicial district are *ex officio* sanitary inspectors.

Factory Acts in 1887 and 1889 were passed, intended to deal specially with the health of employees, as regards prevention of accidents, and improvement of ventilating and other sanitary appliances.

As the work of Local Boards has increased, many evils previously but little understood as to their nature, or not fully comprehended as to their extent, have come into prominence and attempts to deal with them have been made. Especially is this the case with diseases of animals. Tuberculosis has been found to be of undersirable frequency in milch cows and other cattle. Actinomycosis has been accurately diagnosed, and its contagious character demonstrated; while anthrax and hog-cholera have from time to time appeared in localised outbreaks.

With a view to dealing effectively with these diseases, detrimental both to the high character of Ontario stock and to the public health interests, an amendment to the Consolidated Act, Sec 99, was passed which provides that any Medical Health Officer may cause to be seized, any animal known to be affected with any of these diseases. Prosecution of any person who has in his possession any animal he knows to be suffering from any of said diseases may likewise be made.

During 1891 the Consolidated Act, 1887, was amended, with a view to combining local sanitary areas now under Local Boards of Health, as townships, under a single Medical Health Officer, who is to be known as a County Medical Health Officer. This provision if carried into effect will give to such officer the powers now laid upon any Medical Health Officer, and supplies a method by which such officers can be paid an adequate remuneration for the more extended work laid upon him as a county officer.

Such is a summary of the advance in legislation in the ten years during which the present public health organization has existed. Its steady growth is not more illustrative of the unlimited extent to which the work of protecting the public health by preventing disease is capable than it is of the rapidly increasing knowledge on the part of the public of the meaning of Preventive Medicine, and of the practical value of the measures recommended by Boards of Health and carried out by their Executive Officers.

CHAPTER III.

PUBLIC WATER SUPPLIES.

During the year as will be seen from the analyses in the accompanying Table much attention has been paid to the public water supply problem in Ontario, considered from the health standpoint.

As has been before remarked, Ontario stands in a unique position amongst the countries of the world, or even States in America, as regards water supplies. It is practically surrounded by immense bodies of fresh water lakes, on the shores of which many of its most important cities are built. But in addition to this the undulations and erosions of the underlying rock-strata, and the varying depth and character of the soils of the post-glacial deposits, create not only numerous inland lakes, streams and large rivers, but also underground waters both artificial and deep. Indeed water supplies of every class abound and many districts are so favorably situated that it becomes a question to decide which of the several shall be adopted for public purposes.

As regards the qualities of these waters of different kinds, something has before been said and much has been written in other countries as regards constant characters attaching to each class. It may be said in a broad way that there are certain distinctive differences attaching to the several waters; but a glance at the analyses will show in many cases that as regards the same waters analysed at various times, differences exist quite as marked as those distinguishing the different classes.

(*The Analyses are made in parts per Million.*)

CLASS I: GREAT LAKES.

——	Month.	Year.	Free Ammonia.	Albuminoid Ammonia.	Chlorine.	Oxygen in 4 hrs.	Oxygen in 15 min.
Windsor	December.	1891	0.032	0.280	4.00	2.064	.....
Niagara Falls	October ...	1891	0.026	0.092	4.80	0.530	0.131
Niagara Falls	October ...	1891	0.036	0.122	4.80	0.536	0.179
Mimico	April	1891	0.040	0.084	5.00	.....	.....
Toronto	April	1891	0.016	0.090	4.40	0.844	0.086
Brockville No. 1	September.	1891	0.026	0.126	5.60	0.708	0.340
Brockville No. 2	September.	1891	0.020	0.120	6.00	0.820	0.365

CLASS II: LAURENTIAN RIVER WATERS.

Parry Sound (June)	June	1891	0.140	0.180	1.50	3.690	2.190
Parry Sound	December.	1891	0.015	0.120	1.60	2.348	1.624
Arnprior, Ottawa River	November.	1891	0.016	0.190	2.00	7.560	.....
Arnprior, Madawaska No. 1	November.	1891	0.002	0.190	1.40	4.708	.....
Arnprior, Madawaska No. 2	November.	1891	0.018	0.200	1.40	4.576	.....
Rat Portage No. 1	March	1892	0.160	0.140	3.50	0.608	.....
Rat Portage No. 2	March	1892	0.035	0.333	3.50	7.236	.....

Class III: Deep Underground Waters.

	Month.	Year.	Free Ammonia.	Albuminoid Ammonia.	Chlorine.	Oxygen in 4 hrs.	Oxygen in 15 min.
Chatham (Jordan well)	October	1891	0.320	0.126	204.8	....	.....
(Moodie well)	October	1891	0.340	0.055	203.0	.....	.....
(Purser well)	October	1891	0.016	0.200	48.4	.....	.....
Chatham Water Works No. 1 (well)	February	1892	0.320	0.080	202.0	1.008	0.400
Chatham Water Works No. 2 (stand-pipe)	February	1892	0.320	0.100	202.0	1.202	0.808
Chatham Water Works No. 3 (tap)	February	1892	0.400	0.080	202.0	0.740	0.421
Essex Centre	June	1891	0.252	0.080	54.0	2.025	0.695
Goderich No. 1	March	1892	0.013	0.040	50.0	0.454	0.189
Goderich No. 2	March	1892	0.013	0.040	40.0	0.262	0.188
Lindsay	February	1892	0.320	0.045	7.0	0.636	0.584

Class IV: Shallow Under-Ground Waters.

Waterford	November	1891	0.010	0.030	6.4	0.428	0.049
North Toronto No. 1	May	1891	0.013	0.260	5.0	.....	.....
North Toronto No. 2	May	1891	0.002	0.880	6.0	.....	.....
Kincardine	April	1892	0.040	0.112	19.2	.....	.....

Class V: Spring Creeks.

Berlin No. 1	November	1891	0.026	0.12	4.00	2.160	1.484
Berlin No. 2	November	1891	0.020	0.21	4.00	2.564	2.292
Georgetown	September	1891	0.020	0.09	3.2	1.602	0.720

Class VI. Rivers.

Guelph	April	1892	0.132	0.16	4.00	.....	.....
Scugog No. 1 (at Lindsay)	February	1892	0.72	0.38	6.00	5.240	.....
Scugog No. 2 (at Lindsay)	February	1892	0.64	0.36	6.00	4.600	2.264

Class VII: Wells.

Berlin	November	1891	0.08	0.131	48.0	1.576	1.248
Snyder Well Waterloo	October	1891	0.08	0.15	.....	.....	.....
Well at Wyoming	October	1891	0.018	0.15	20.8	2.076	0.960

From wells at Petrolia only a few oz. of water were sent in. The chlorine of each sample was determined as below in parts per 1,000,000.

Wells.		Cisterns.	
a	4.8	1 L	144.0
b	222.4	1 C	144.0
c	33.6	1 J	169.6
e	10.4	1 McB	132.0
f	65.6	1 R	163.2
g	4.8	1 S	280.0
h	16.0	1 X	132.0
i	32.0		

A study of these Tables, as indeed the study of the chemical analysis of any series of water samples, makes it manifest that no single characteristic nor combination of qualities, is sufficient to form absolute conclusions upon, as regards their sanitary excellencies or defects.

The following from the Massachusetts State Board of Health Report for 1889, neatly sums up the matter.

"Students of sanitary science have attempted to establish certain standards of purity of water based on the determination of nitrogen. These standards express limits for organic nitrogen or albuminoid ammonia, free ammonia, nitrites and nitrates, beyond which the water containing them should not be used for drinking. Some of them have the sanction of sanitary congresses and some are merely the expression of individual opinion.

"The application of these standards of purity has condemned many waters, which were certainly unfit to drink, but it is equally certain that many wholesome waters have been thereby also rejected. The fallacy involved in making "standards of purity," based upon the organic nitrogen, ammonia, nitrites and nitrates, is apparent when we consider that these substances are not injurious in themselves, at least to the extent they are found in natural waters, and that the presence of any one of these substances in water does not in itself necessarily carry with it any indication of its origin. These standards are relics of days in which the harmfulness of a water was supposed to be the direct result of the injurious action of specific substances found in it. The theory of to-day is that it is (in the large majority of cases) to the presence of micro-organisms in water that its harmful influence is due, and that the results of chemical analyses have their highest value in the light that they throw on the quality of the water from the standpoint of bacterial contamination.

"The use to which these determinations should be put, therefore, is to discover, if possible, the origin and history of the nitrogen compounds in the water. The study of the long series of results obtained in the analysis of waters of the state of widely different character and surroundings together with results obtained at the Lawrence Experiment Station of sewage purification by intermittent filtration, has broadened our views of the subject and has enabled us to break away from many of the traditions which have hitherto controlled the opinions of sanitarians."

The diagrams given on the preceding page, giving the death-rates of various cities, further illustrate this fact.

With regard to Chicago, as various analyses of its waters show, there are very few days in which the presence of sewage contamination, shown by analysis, (1556) reaches a point, such as to bring the water below the line of a first-class water. Yet if a series of analyses of the same Chicago water be compared in connection with wind currents, it becomes apparent that the analyses do show at certain times corresponding with certain winds such differences as to cause sewage contamination to be suspected. This contamination is beyond doubt proved by the prevalence of typhoid fever and the numerous deaths therefrom.

Turning, however, to the classes in the Table, it must be concluded as regards underground waters at Chatham from beneath the densest blue clay, rising to the surface 60 or 70 feet in borings into a stratum of water-bearing sand, lying upon the hard Hamilton calcareous shales, that they exhibit such marked abnormalities, both as compared with one another and with other classes of water, that we must consider them as a class *sui generis*, having no features in common with shallow underground, or with any surface waters.

In some samples free ammonia is abnormally high, in some low, while the sample which may show high free ammonia may be low in albuminoid ammonia, while the opposite is seen in other samples. Again, if the chlorine be studied along with these, one would at first conclude that some samples are undrinkable; while in another albuminoid ammonia is high and chlorine low, as compared with other samples having much less albuminoid ammonia. (In this connection it may be mentioned that artesian waters are usually high in chlorides and frequently high in free ammonia, and in some cases albuminoid as well. This is seen in the artesian wells of Illinois.)

Some of these samples were taken from test-borings recently made in the middle of meadows through the blue clay, where surface contamination was absolutely impossible. It will be remembered that this district is almost a prairie region and that it overlies the petroleum-bearing rocks and that in all these wells gases come up with the water. The flow from an individual well 12 inches in diameter, in some instances amounts to 300 gallons per minute and one of these waters is being piped to supply Chatham situated on the Thames, a muddy stream, at this point on a level with lake St. Clair. The water from the sanitary standpoint, appears unexceptionable and is likely to prove a most satisfactory supply.

The Chatham samples marked water-works 1, 2, 3, are the same water taken from the well where the flow is directly from the boring, from the receiving well and from a city tap, after flowing four miles through an iron pipe.

In the class f shallow underground waters the same differences are seen, not only between waters from different sources, but from the same well at different periods. That of North Toronto well illustrates this point. The water rises from a coarse sand lying on the top of blue clay some 22 feet from the surface. The well is on ground rather higher than any surrounding it, the surface being undulating, unless at a distance of a mile or two. The water flows in very rapidly, a well 12 feet in diameter supplying some 7,000 gallons an hour. No buildings are within a quarter of a mile and the well is sunk in an old meadow. The two samples taken at different periods show marked variations from each other. Apparently the high albuminoid ammonia in the second sample is directly due to the solution of albuminoid matter from the deep roots of the meadow grass. The presence of any deleterious matter beyond this seems an impossibility.

The sample of Waterford water taken from a spring is interesting, since, while showing the lowest free and albuminoid ammonia of any sample, it was forwarded for analysis on the supposition that it had caused an outbreak of typhoid.

The same remarks may be made with regard to spring-creeks in the matter of vegetable contamination, but in these it is manifest that quite another possibility of danger arises. They are seen to have as much chlorine and more albuminoid ammonia than Chicago water, proved positively dangerous by prevalence of typhoid.

They everywhere swarm with bacteria; and it is manifest that, with barnyard or sewage contamination above, and a temperature at certain seasons favorable to multiplication of bacteria, they may similarly become dangerous in a manner impossible to either of the underground sources.

Allied to these latter is such a water as that of Windsor, which although a great lake water, has been flowing between banks in the St. Clair river where sewage pollution occurs and afterwards flows out of lake St. Clair, a broad and shallow expanse, loaded with vegetable matter, into the Detroit river. While its chlorine is no greater than that of lake Erie or lake Ontario, it will be seen that though its free ammonia is as low as either, yet its albuminoid ammonia is thrice the amount of either. That this water may and almost certainly will become a dangerous water may be learned from the facts in the report in Part II on Windsor and Walkerville Water Supply, from which it will be seen that Walkerville pours a notable amount of sewage into the river at a point less than a mile above the Windsor intake.

This contamination may be taken as an explanation of the prevalence of typhoid in Windsor in 1890, as compared with that of Detroit which takes its water several miles higher, as seen in the preceding diagrams.

This river water presents an admirable illustration of the influence of vegetable matter on the once purified water of the great lakes; since it increases in its albuminoid ammonia to a point even higher than the Arnprior waters in two rivers, both flowing from virgin soils, situated on the Laurentian rock formation. That these river waters do at times become intensely dangerous when contaminated with sewage, even slightly, is seen in the historic fever epidemic of November and December, 1887, in Ottawa, where 1,500 cases occurred in six weeks. Several small private drains had contaminated the water in the aqueduct. This danger may likewise arise in the future at Parry Sound, where

it will be seen the vegetable matter may be in large amount, while with certain winds, the water is swept in a current to the point of the water-intake. As the town is built on both sides of the river, on rocky soil, sewage will gradually, as the town grows, find its way to the river; and at certain seasons, notably in the autumn, the Ottawa calamity may repeat itself here.

Amongst the highest degree of vegetable contamination reached in these analyses is that of the Scugog River at Lindsay. It flows from a shallow marshy lake with much drowned land; and was taken from under the ice when oxidization does not go on to any notable degree. Becoming warm in the summer, this may, and if not purified by filtration, will almost certainly be productive of trouble.

In connection with these chemical analyses, bacteriological analyses of the same waters have also been made wherever possible. Some of these contained in the following tables studied in relation to possible dangerous pollution are of much interest. The chemical analyses of Berlin water consisted of samples from the city water supply and two samples from suspected wells. The bacteriological analyses showed that the city waters, sample 1, contained only 200 bacteria per cent.; whilst the two wells Nos. 3 and 4 contained 18,000 and 34,830 respectively.

On account of a considerable epidemic of typhoid at Port Elgin, Ont., in autumn of 1891, a bacteriological analysis was made of a number of wells in the town. As there was only a small quantity of water in each sample, a chemical analysis could not be made; but there was sufficient to allow of a determination of chlorine and a comparison of the parts per million of chlorine with the bacteria per cent. to give some interesting results.

They were as follows:—

PORT ELGIN WATERS.

No.	Bacteria per Cubic Centimetre.	Chlorine in parts per million.
1	10,300	60
2	15,255	14
3	885	6
4	188,145	15
5	282,500	84
6	7,060	130

As all these wells were practically from the same water bearing stratum, we may reasonably assume that the minimum amount of chlorine most nearly represents the normal. This was No. 3 with 6 parts per million, and we find the bacteriological results bears out this supposition for No. 3 had only 885 per c.c., a fairly low result for a well water. On the other hand all the other wells were much higher in chlorine and also in the number of bacteria per c.c.

During the summer of 1891 a number of bacteriological analyses were made of lake water at Toronto in connection with the investigation of lake currents. These throw some light upon the distance to which bacteria may travel, despite the claim that sewage pouring into a large body of water like Lake Ontario must be so enormously diluted as to render it harmless. On July 1st the wind on the Bay at Toronto was mostly strong from the east, thus setting the bay water toward the western gap. On the morning of 2nd it shifted to the north and blew lightly from that direction for about eight hours. The results are as might be expected. The continuous easterly winds had cleared the eastern

part of the bay of contaminated water, and the eastern gap only showed 180 bacteria per c.c. on the morning of July 2nd. Still the northerly wind had its effect and we find one mile south-east of the gap 86 per c.c. and one mile south-west 92, only a reduction of about ½ in travelling a mile with a light wind. Results on July 6th are equally instructive; the wind on July 3rd was mainly south-west and west, blowing a gale; on July 4th, most of the day west 20 miles an hour; and on July 5th, west to north-west, about 20 miles an hour. The effects of this wind are to set the current of contaminated water from the bay out through the eastern gap, and our bacteriological results are as follows: Eastern gap, 1,100 per c.c.; south-east of east gap, 1 mile, 570 per c.c.; south of east gap, ¾ mile, 702 per c.c.; south-west of east gap, ¾ mile, 534 per c.c., results tallying well with those of July 2nd.

On July 8th similar results were obtained. The wind was as follows: July 6th, mainly west; July 7th, west, shifting to north and holding north most of the day, as well as the early part of the 8th. Bacteriological analyses gave eastern gap, 11,200; south-east of eastern gap, 28,000; south of eastern gap, 12,096.

We must recognize from these figures the possibility of the transportation of sewage for a considerable distance with very slight diminution of bacteria, dependent upon its presence.

No bacteriological analyses were made of Windsor water, but the results of the analyses of Lake Ontario water quoted above certainly have a bearing on the contamination of Windsor water supply by Walkerville sewage; for if we find contaminated water from Toronto bay carried out, say a mile into Lake Ontario without much change in bacterial contents and by only such currents as are developed by winds, much more must we accept such a possibility where we have a rapid and continuous current such as is present in the Detroit river, with a sewage outlet directly in a line above the water-works intake.

At St. Thomas, the water supply is obtained from Kettle Creek, filtered by means of Hyatt filters. The Hyatt system consists in the addition of a small quantity of alum for each gallon of water before filtration, thus clarifying it considerably by the formation of a precipitate. It is claimed that this precipitate in falling entangles and brings down with it the bacteria, so that they are more easily removed by filtration. The filtration takes place through sand contained in large horizontal cylinders, provision being made for the reversal of the stream of water once in 24 hours, so as to thoroughly cleanse the filters.

In St. Thomas there are two of these filters, each with a filtering capacity of 500,000 gallons, and they are at present putting in an additional one. The following are some of the results:

		Bacteria.
July 3rd.	Before filtration	45,000 per c.c.
	After filtration	90 "
Oct. 23rd.	Before filtration, average	1,240 "
	After filtration, average	44 "
	Pumping at rate of 1,324,800 gallons per 24 hours.	
Oct. 24th.	Before filtration, 10.30 a.m.	1,240 "
	Water at 10.30 a.m., filtered through Filter No. 1, cleaned at midnight	59 "
	Water at 10.30 a.m., filtered through Filter No. 2, cleaned at 10 a.m.	270 "
	Mixed water at 11 a.m., filtered through both filters	65 "
	Pumping at rate of 810,720 gallons in 24 hours.	
Oct. 26th.	Before filtration	1,545 "
	After filtration	70 "
	Pumping at rate of 794,880 gallons in 24 hours.	

These results show a high degree of efficiency in the filters as in the case of the examination of Oct. 23rd. The pumps were sending water through the filters at a rate about ¼ quarter as fast again as their capacity allows for good filtration.

CHAPTER IV.

OUTBREAKS OF DISEASES.

With the absence of more than localized outbreaks of contagious diseases, except in the matter of Diphtheria, the work of the Board during 1891, was as will be gathered from the various special reports published in Part II., devoted especially to the investigation in the laboratory of special and peculiar outbreaks of disease, and to the examination into the location of public water supplies and the analyses of their waters, and to assisting municipalities where systems of sewerage were under consideration.

This work possesses in the highest degree the characteristics of preventive medicine. Supply a town with a wholesome water in abundance, banish all local supplies, as contaminated wells, and give it a modern system of sewerage properly constructed, and it will be found that epidemics of preventable filth diseases have become practically eradicated. This may be said with truth, since if these two things are supplied, a city is almost certain to be supplied at the same time with a vigilant medical officer of health, with modern ideas, who will by promptness check any occasional outbreaks at their beginning. This is seen in the notable progress in the Province during the year of the establishment of wards, or better, of separate hospitals to which first cases of diphtheria and other diseases can be removed. The necessity for such hospitals has constantly been urged by your Board, and arguments will again be found in the report subjoined, of the Secretary presented at its last quarterly meeting.

FEBRUARY 2ND, 1892.

To the Chairman and members of the Provincial Board of Health :—

GENTLEMEN,—In presenting to you a report of work for the quarter passed since last meeting, I beg to first recall your attention to various matters of importance, then considered.

Small Pox.—It will be remembered that just at that time the action of several state and city boards resulted in having a quarantine inspection established over trains passing from Canada into Michigan, both at Sarnia and Detroit, owing to fears that small-pox might pass through Ontario from the Province of Quebec. You will also remember the protest of your Secretary, published shortly afterwards. I may say that, from whatever cause, the quarantine exercised, as seen from the instructions issued by the Marine Hospital Service were for an inspection of a nominal character. If inspection were unnecessary their only use would seem to have been to interrupt traffic ; if necessary, the inspection being only partial and applicable to persons coming from the affected Quebec counties, was useless, since passengers from these counties only required to buy tickets first to Montreal, and thereafter new tickets, and so evade inspection. With a view to having what seemed to me an unreasonable quarantine removed, I went subsequently to Montreal and had a conference with the Inspector of the Marine Hospital Service sent to investigate the outbreak, along with the Provincial Health authorities of Quebec. After a careful investigation of all the statements made to him with regard to the facts he telegraphed favorable reports to Washington as to the state of affairs, and subsequently proceeded to the infected centres, and made his report thereon, it being published in the Bureau Report, a copy of which is presented herewith. It is with pleasure that I state as you see from this, the last bulletin of the Quebec Board, that every case has disappeared from that Province. With the wide dissemination of first cases in October, it may fairly be said that a serious outbreak of small-pox was never more promptly stamped out than this has been. In only two instances did it spread from the primary centres, only once from the primary municipalities, and never outside the Province of Quebec, though in all there were 143 cases. It is to be hoped, that henceforth, no fears need ever be entertained either in Ontario or in the United States that small-pox will reach them from Quebec.

Diphtheria. It will be remembered that at our last session the newspapers of Toronto and the Local Board of Health, were filled with alarm at the epidemic progress of diphtheria in the city, and that a resolution was adopted by this Board after an interview with representatives of the Local Board seconding the latter's efforts to cope with the disease.

How serious the outbreak has been is seen from the death-rate for :

	Deaths.	Cases Reported.
November 1891	68	..
December 1891	36	..
January 1892	20	..
February 1892	22	..

A temporary isolation hospital was established in which 226 patients have been treated to date, and in which there are still 46, not including a certain number of cases treated in the General Hospital. (Deaths 27.)

As in all outbreaks, especially in towns and cities, it has proved a matter of great difficulty to prevent the transmission of the infection by means of school children. Either the children have returned to school when infection still existed in their throats, or they bore it there on their clothes, which, if once disinfected had become re-infected in the house which had been but imperfectly cleansed. Where families live in small houses, it would seem practically impossible to thoroughly disinfect a house and contents, at least in winter, without transferring the inmates for a day or two to another building.

So many illustrations of this can be obtained from the Board's correspondence, in addition to what is within the experience of every practitioner of medicine, that it might be laid down almost as a law. This being the case, I may be excused for adverting to what this Board has so strongly urged for years, viz.: the widest application possible of the idea of removal of first cases from houses where other children are.

1st. For prevention of second cases.

2nd. For economy of time and money in treating cases.

3rd. Economy of time and money in the troublesome work of disinfecting, re-papering, etc. If an estimate could be made of the aggregate expenditure which this last item alone has involved in Toronto within three months, the amount would surprise, if not astonish us.

If then isolation hospitals are so essential to this work, a brief reference to them as existing in England, which has so long been the exemplar of Public Health, may be of interest.

The name of such hospitals, as remarked by Dr. Thorne, in his classical report published by the Local Government Board of Great Britain, is a matter of much importance. All designations, referring to diseases such as Small-pox Hospital, or Fever Hospital, or those bringing the question of infection into prominence, such as Infectious Hospitals, should be avoided. Names, as *Crozier Lodge*, *House of Recovery*, *The Sanatorium*, are given as instances of a practical euphemism. These hospitals are always spoken of as the hospitals of the *Sanitary authorities*.

The same report states that in 1879 296 sanitary authorities had arrangements of either a temporary or permanent character. Dr. Thorne emphasizes the essential advantages in practical results gathered from experience of having such hospitals of a permanent character. In such instances, when the hospitals are in constant use as in populous districts, there is always a permanent matron, a nurse, servants and porters. The nursing staff is increased as occasion demands. Illustrations and drawings are given in the report of hospitals from the larger substantial structures to cottages, huts and tents, made use of in different cities, towns and villages.

In this volume of 400 pages, the amplest information on every detail of cost, management and results is given, and the number of patients treated in many instances is also stated. Naturally, a most conspicuous fact appears, viz., that a very large proportion of the patients were children – notably of those suffering from scarlatina. Since that period diphtheria has notably increased in England, and these cases are now being largely treated in these isolation hospitals. To illustrate the increased use of such hospitals, I quote the following from the report of 1890, issued by the Metropolitan Asylums Board on Infectious Hospitals and Imbecile Asylums.

Although 'Compulsory Notification of Infectious Diseases' previously existed in a large number of towns in England, it was not till 1889 that the General Infectious Diseases (Notification) Act was passed.

The following total of notified cases is given for the 5 notification districts for 53 weeks ending January 3rd, 1891:

Smallpox	60	Typhoid Fever	2,877
Scarlatina	15,330	Cholera	25
Typhus	35	Erysipelas	4,598
Relapsing Fever	7	Puerperal Fever	206
Diphtheria	5,870		
Membranous Croup	550	Total	29,795
Continued Fever	237		

Or nearly 6 in every 1,000 of a population of 5,000,000. Various statements made indicate that owing to divided jurisdiction, a very considerable number of cases were not reported to the Board.

The total number of patients under treatment during the year was 10,123. The total admissions were 8,334, as compared with 5,772 in 1889. 'This increase in the number of admissions was probably due, not to any unusual prevalence of scarlet fever in the metropolis . . but to the increased favor with which the Managers' Hospitals are generally regarded, and to the increased efforts to secure isolation of infectious cases on the part of the various local sanitary authorities.'

The mortality at various ages of 36,849 cases admitted into the Board's Hospitals since opened was only 9.97 per cent. Over 50% of these occurred in children under 5 years of age, and only 4.76 per cent. died in patients over 15 years of age.

The report states, "Such results are sufficient to prove how essential it is that every precaution should be taken to prevent the exposure of young children to infection, and they effectually dispose of the once popular notion among ignorant people that it is better to suffer from the disease while young."

To show the terrible fatality of diphtheria, though only about 3% of the total admissions were of diphtheria, viz. : 942 cases, in 1890 there were 316 deaths, or 36.07%, while that from scarlet fever was only 7.79%. The remark is made that diphtheria previously but seldom admitted, is owing to its increasing prevalence in London, being isolated yearly more and more. That it is comparatively not so prevalent in England as in Canada and the United States is seen from the fact that there were but 1,588 cases in all London in 1889.

These various statistics become of interest as showing how appreciative are the sanitary authorities in England of the value of life, and of the cost of epidemics. That the views which this Board has for years held and disseminated are those of the highest sanitary authorities is admirably illustrated by a paper discussed before the Sanitary Institute of Great Britain in 1887, on "Organization and Administration for the Control of Infectious Diseases," by John F. J. Sykes, B. Sc., Medical Officer of Health for the London District of St. Pancras.

Eliminating the treatment of individual cases, he deals only with "those measures which with a proper organization can be actually carried out in a systematic manner and on a comprehensive scale by medical officers of health."

He divides infectious diseases as follows, and their treatment as follows :

Temporary Provision.....	Cholera	Special Epidemic Disease.
Hospitals	Smallpox Scarlatina Typhoid Fever Typhus " Continued " Diphtheria	Major Infectious Diseases.
Homes.....	Measles Rotheln Whooping Cough Mumps Chicken Pox	Minor Infectious Diseases.

And then says, "All these diseases should with advantage be excluded from general hospitals, and come properly within the scope of isolation hospitals."

Smallpox should be treated in an isolated building at a distance from others. In London it is treated in Floating Ship Hospitals on the Thames.

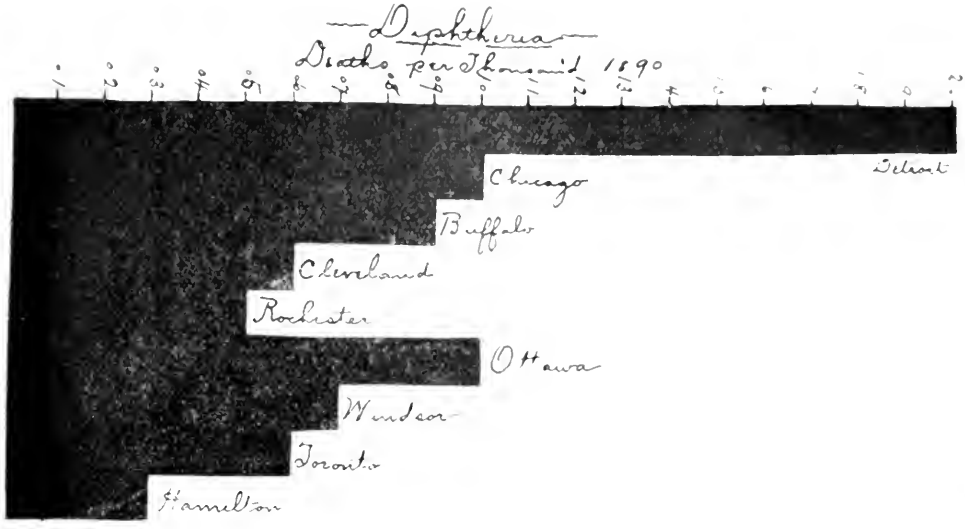
Scarlet Fever "would be more advisedly treated in a building separated somewhat from the general Fever Building, or in a separate wing"

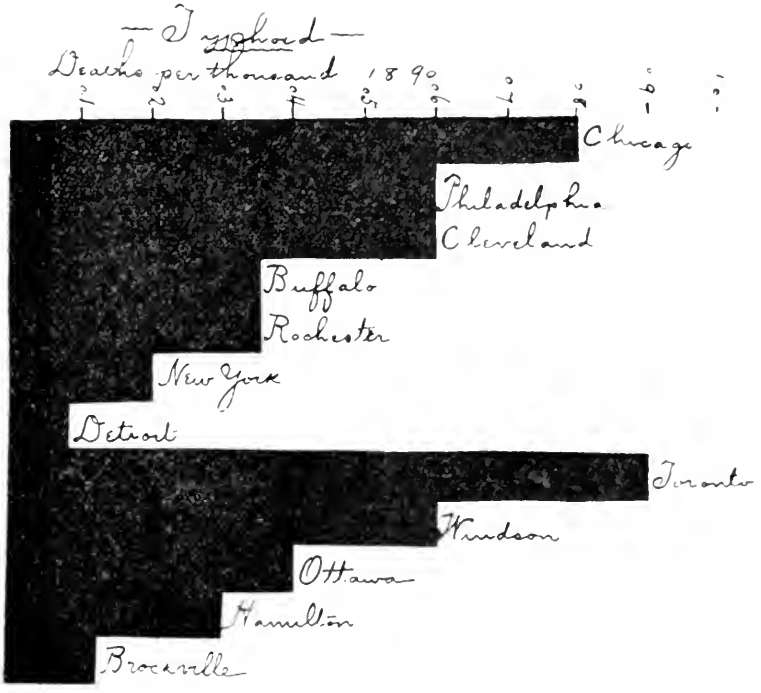
He places diphtheria under the heading of general fevers and says, "These might, with advantage, be treated in a single building, possibly in separate wards." Regarding situation he says :

"Isolation of the whole hospital or sanatorium must have regard to two points : Firstly, that it should be removed from dwellings : secondly, it should be out of the track of ordinary traffic."

The success of the whole work depends upon notification of cases, since as our officer's duty is to protect the community against an epidemic of infectious disease, that duty obviously cannot be carried out unless he is informed betimes of it presence." Thus notified, he does his duty :

"1. By watching the approach of an epidemic, to make timely provision.


Diphtheria
Deaths per Thousand 1890
Detroit
Chicago
Buffalo
Cleveland
Rochester
Ottawa
Windsor
Toronto
Hamilton


Typhoid
Deaths per thousand 1890
Chicago
Philadelphia
Cleveland
Buffalo
Rochester
New York
Detroit
Toronto
Windsor
Ottawa
Hamilton
Brockville

"2. By ascertaining the cause of the epidemic, to prevent its continuance or recurrence.

"3. By disinfecting, to prevent the house, etc., being a constant source of infection.

"4. By removing those patients certified by their medical attendant to be without proper nursing or isolation, in order to prevent them becoming centres of infection."

Regarding the latter he points out that there are three methods for preventing the spread of infection :

"1. Removing the infectious from the healthy.

"2. Removing the healthy from the infected.

"3. Boycotting the family or household."

Regarding these, he says of the third, as in the case of closing workshops, factories, shops, etc., "it is ruinous and iniquitous, unless compensation be allowed. Local bodies are not given to generosity, and compulsory compensation would lead to endless difficulties."

"The second may be adopted under better circumstances by the healthy betaking themselves betimes elsewhere."

"The first course, namely, removing the case to hospital, is the kindest one to adopt under these circumstances."

Regarding individual objections to the latter, "Dr. Littlejohn, of Edinburgh, reported in 1882, that there were 7,063 notifications . . . and that in not one of the instances was it necessary to use the compulsory powers possessed for the removal of patients."

I have dealt at some length with this subject of isolation, since it has happened that during the period since the last meeting of the Board, the Regulations then adopted with regard to diphtheria have become law by an Order-in-Council, dated Dec. 23rd, 1891 ; and already the good effects of this order have made themselves felt, by the daily reporting to the Board of outbreaks in different parts of the country, which without the Order, would in many cases never have been reported, and the decision to erect permanent isolation hospitals has been come to in at least two instances.

As will be gathered from the correspondence, a number of other important subjects have come up for action. And among them will be submitted the specifications for public waters supplies at Arnprior, and Parry Sound. The plan of a sewerage scheme for London will also be presented, and reports on water-works in several other towns.

That even watchfulness on the part of a Medical Health Officer fails to prevent the prevalence of diphtheria and typhoid where the two requisites of good water and sewage are wanting, may be seen in the unfortunate statistics of deaths for instance in Guelph, as compared with a town like Brockville, which has complete systems of public water and sewerage.

Comparison between deaths in Guelph and Brockville :

	Guelph.	Brockville
Diphtheria	39	0
Typhoid Fever	1	2

That such differences will result sooner or later in the commercial retardation of the one and the proportionate advancement of the other is made apparent, when the value of lives lost and the expense of sickness are taken into consideration.

From the preceding comparison if we estimate the loss of time in sickness and nursing on some assumed value, such as as a fortnight's sickness in diphtheria, and the loss of time of a nurse, we will see that a very great loss was incurred by Guelph which to Brockville was saved. Can any one question which city will attract manufacturers and additional residents.

That your board has very properly been required by law to investigate existing and proposed systems of water supply is illustrated in the following diagrams, and further by dangers, which are illustrated in the report on the Windsor and Walkerville water supply and sewerage difficulty found in Part II. If one municipality adopts the most convenient and economical method of sewage disposal without due regard to the safety of its neighbor's water supply.

The diagrams would seem indeed to teach us, if we compare for instance, Chicago and Toronto with Detroit and Buffalo, that law of pollution exists, viz : *That taking a series of years, the pollution of even relatively large bodies of lake water, which having no regular flow, are liable to carry sewage to a water intake, will at certain seasons and with winds moving sewage towards the point of supply, cause outbreaks of typhoid of a more or*

less epidemic. I further believe that we can establish from these diagrams another law, viz : " *That in cities obtaining practically all their drinking water from a public supply, whose source is beyond the possibility of contamination typhoid fever will practically disappear from the list of causes of mortality.*"

Water Works System of Sewage.—During the year the Board has investigated specially the water supplies of Windsor, St. Thomas, Chatham, Woodstock, Georgetown, North Toronto, Toronto, Essex Centre, Trenton, Galt, Lindsay, Arnprior, Leamington, etc,, and the sewerage systems, either proposed or under construction, of Berlin, Brantford, Walkerville, West Toronto, Peterborough, St. Mary's and Barrie.

Each of these presents some distinctive features, as may be gathered from the special reports thereon ; but two facts are apparent, viz :

1. That in all new sewerage systems in Ontario, the separate system is that which is being adopted as both the most sanitary and economical.

2. That Canadian engineers are in every way possible endeavoring to construct works, as regards sewage disposal, in conformity with the principles taught and encouraged by the Board, and upheld by the Public Health Act, by which the rights and interests of the citizens of neighboring municipalities are protected to the fullest extent. (*Vide* reports on Berlin, Brantford, West Toronto, Peterborough, etc.)

It is further most gratifying to know that in no case have the views of the Board in this matter been challenged as regards their wisdom from the practical standpoint. When in civil cases our judges are deciding that a neighbors privy in a city is a nuisance and does violence to civic decency, and orders its removal, we need not fear but that they will promptly insist that the larger nuisances of sewage shall not be allowed to pollute a neighbor's drinking water.

Animal Diseases.—As will be seen in the special reports found in Part II, the year has been an active one in the field of contagious diseases of animals. The report for 1890 dealt at some length with the character of actinomycosis and tuberculosis in cattle. With regard to the former, the summary of laboratory work will show that the investigation of the disease has become of much interest in the Province. Its presence in many sections was indicated last year, while this year several cases have occurred where this Board and the Local Boards have taken active measures to prevent the transit and sale of animals affected with it. The true character of the disease as regards its transmissibility from animal to animal, is causing much discussion ; but it would seem as if the same arguments which so long prevented tuberculosis and leprosy from being considered as contagious are still being used to blind the public as to the true character of actinomycosis. If popular observation, which in the long run is not far wrong, be taken for anything, the repeated occurrence of actinomycotic animals in the same herd, after first cases have been introduced, ought to weigh strongly with every practical person on the side of its contagiousness from one animal to another. The matter of degree is the only question which seems to have a practical bearing in the matter.

The report on the outbreak of anthrax at Acton on the flat lands along a creek below a tannery has once more brought this disease into prominence. Its true character was early established by laboratory investigation and the conditions of its introduction into the neighborhood were fully investigated. Information was further obtained of the reappearance of the disease on the flats along the River Speed at Guelph where it first appeared five years ago. The persistency of the disease, once seeded in these places illustrates in a remarkable manner the persistency of the spores of many cryptogamic forms of life, when once introduced into a district. Diphtheria and typhoid, rust and the black-knot, mildew, etc,, are common illustrations of the fact,

The instances of the Acton tanneries, the Neustadt tannery, especially point to this common source of nuisance as demanding special attention on the part of the Board. This class of industry is likely to grow in the Province, and unless these establishments are arranged on a proper sanitary basis of construction at first they are sure sooner or later to become sources of trouble to local sanitary authorities.

New Cemeteries.—During the past year there have been a number of applications to the Board for permission to establish cemeteries, commonly at points adjoining old ones within the confines of an incorporated town or village. In the several instances submitted to the Board there has been evinced an intelligent appreciation on the part of their communities of the sanitary questions involved. The sites selected have in every case been free from the objection of endangering through drainage local water supplies.

Many of these municipalities, originally incorporated much larger areas for building purposes than their progress has demanded, and there is no reason why, under the safeguards established by law requiring the submission of these sites for the approval of the Local and Provincial Boards, vacant sites within corporations should not be thus utilised.

Inspection of Milk Supplies.—The anxiety to have public milk supplies improved in quality and in wholesomeness, has caused this subject to receive much attention from Local Boards during the year. The work done on this subject by the Board during the year will be found summarised in the paper found in Part II of the Report, which was presented by your secretary to the American Public Health Association in October last. The possibility of Health Officers, medical and sanitary, examining by a reliable test, frequently and rapidly, samples of milk taken from the waggons of dealers, is becoming understood, and in such apparatus as the Babcock tester has been found the solution of what has hitherto proved the greatest stumbling-block to progress in this work. The investigations of the sanitary conditions of the animals, stables and water supply, and of those engaged in handling milk, is however, a work of such magitude that much requires yet to be done even by our most progressive Boards, ere it can be said that this work is abreast of the work in other branches of sanitary work.

Transportation of the Dead.—The question of transportation of dead bodies by train, has been the subject of frequent correspondence with railway and municipal authorities The Board has on several occassions expressed its views on this matter, and as seen in its last expression of them, inclines more strongly than ever to the view that the public interests demand that public sentiment in the matter of burials shall so change that the idea of transporting any dead body, but especially those dead from infectious disease, will be completely given up.

It is unfortunate that the undertakers have not by legislation been placed in such a position as to be brought directly into sympathy with the work of this Board, as no stronger auxiliary is possible in the work of limiting disease than the co-operation of the members of an association to whom is consigned the duty of conducting the last rites, in all instances, but especially where the deceased had suffered from contagious disease.

Spread of disease by School Children.—The question of attendance at school of children who have recently suffered, or who go from houses where contagious diseases exist, has, owing to the many outbreaks of diphtheria during the past year, taken a position of the greatest prominence in the eyes of the public, and none too soon. As the Board has before had occasion to remark, there is no single cause which probably contributes so largely to the dissemination and continuance of this pest as the introduction of contagion into the school-room. Not only is the air of a school-room commonly contaminated with carbonic acid in excess, owing to over-crowding, but, the dust, composed of particles of every kind borne in on the clothes, boots and person of scholars and kept continually in motion owing to the movement of many feet on the too often defective floors, is constantly being inhaled, and coming in contact with throats which, irritated by dryness of air, from defective heating, and which if containing the germs of contagious disease, cannot fail to inoculate the children.

How the matter is to be thoroughly remedied with the disinclination which exists on the part of many trustees to incur even a small expense for any more modern method of ventilation and heating, is a matter to which the Board may very well devote its attention to.

The following from a County inspector, is, it is to be hoped, an exceptional illustration of the attitude held by some school trustees on the subject of ventilation.

London, January 21st.

Dr. P, H. Bryce,
Secretary Provincial Board of Health,
Toronto.

Dear Sir.—To point the need of unrelaxed efforts to educate or compel people to ventilate public buildings, I quote the following resolution adopted at an annual school meeting held on the 30th ult.

"Moved and seconded, that a vote be taken of those present how they feel on ventilating the school-house. Twenty-eight against it and one for it.

I am,
Yours very truly,
J. Dearness.

Nuisances from Mill Dams.—Another subject of more than ordinary importance, due not only to the interests involved, but to the difficulties in the way of finding some satisfactory method of removing the evil while giving due consideration to individual interests, is that of the effects of dams, booms and slides constructed on streams either for transport of logs, or for milling purposes.

The South River difficulty reported upon in 1890 still remains a *questio vexata*, while others such as that at Huntsville, Caledonia, etc., must soon demand that attention be paid to the hardships of the many sufferers from drowned lands and malaria, who are riparian owners above these dams.

County Health Officers.—These evils, which exist most generally in the newer districts of the Province where lumbering is carried on extensively, call for remark on another question, which as seen in the correspondence of the Board is attracting much attention there. This is the question of County and District Medical Officers of Health. If the case of Muskoka be taken it will be seen that with only three or four settlements of any size in the whole area, medical men are scattered and far apart. Some small settlements are more than twenty miles from a medical man; while the distance is often doubled in the districts still further north. My recommendation made to the Board at the time of the great epidemic of diphtheria in Parry Sound District in 1889 will be remembered. The dying out of the epidemic left the question in abeyance; but it is quite clear that some extended treatment of the subject by the Board is imperatively demanded.

Probably the scheme then outlined, with the further addition of appointing one or more District Medical Health Officers, is that which will be found to most adequately meet the needs of the case and it is respectfully submitted for the Board's consideration.

Interstate Notification.—During the year the practical working of the Interstate Notification of infectious diseases has been shown; several instances having occurred where this co-operative work was called into action. As regards Ontario, it was principally with the Province of Quebec on the east, and the State of Michigan on the west. Small-pox having unfortunately broken out in Quebec simultaneously in several counties owing to infection from one centre, this Board, as also other Boards, co-operating under the agreement, was apprised of the fact, and of the measures being taken for its limitation by the Quebec Provincial Board. So distant and isolated was the seat of the outbreak, and so thorough were these measures, and so regularly were the weekly statements of the progress of the disease received, that your Secretary felt that no occasion had arisen which called for special protection, quarantine, or inspection measures on the part of your Board—the correctness of which opinion events have fully justified. That the State Board of Michigan did not feel this confidence is seen from the subjoined correspondence, and from the action taken by it in calling upon the Marine Hospital Service to institute an inspection on the western confines of Ontario.

Your Secretary took such action, as to him seemed proper, not alone to defend the Province from the imputation of either harboring small-pox within its borders, or being unobservant of events in Quebec; but alone from the injury which such an inspection might have upon the interstate commerce and traffic which has attained such extended proportions. It is with pleasure that it can be stated that the Marine Hospital Service took the most prompt steps to inform itself of the actual condition of affairs in Canada, by sending an officer to Montreal, and thence eastward into the infected districts. His report was most commendatory of the thoroughness of the Quebec Provincial Board and of the activity of its medical staff; and resulted in a prompt removal of the irritating inspection at Sarnia and Detroit. The special correspondence relating to this matter will be found under Part II of this Report.

In the preceding portion of this chapter I have at some length referred to the history of sanitation during the past century, and to some of the special matters which have come under the attention of the Board during 1891.

If the latter indicate that there still remains much work to be done before we have advanced even to the doorway of the sanitary Elysium, yet a single reference to the Tables, as published, of the St. Lawrence quarantine, found in Chapter I, or to the detached and imperfect records of cholera in Canada, is enough to indicate that as regards those diseases whose appearance in past ages has been the signal for increasing fear and general panic, the past century, and notably the last quarter of it has in civilised countries been in large degree freed both from these pestilential diseases and the terrors engendered by them.

To expect that we are free of, or to be freed from disease is not to be hoped for; but manifold are the elements, which, nevertheless, even as imperfectly known to us, enter into the problem of what the sixth commandment requires of us, and of that which philanthropy prompts us to strive for, to give lights to the sons of men.

Ever since fabled Prometheus was chained to icy Caucasus for stealing fire from Heaven that the sons of men might find light and heat, the struggle between the elements of life and death has gone on. Victory too has ever at length ridden aloft on the car of the Destroyer; but life, many-fountained and mysterious, seems ever to renew the struggle, deriving new strength and more adequate weapons from Nature's arsenal, slowly yielding up her priceless stores.

Were Life in her infinite manifestations wholly known, then there were a possibility that man might gradually and at length establish a complete harmony between his life and its environments, and that human existence would be one, in harmonious cadence with the music of the spheres; but as yet night lingers, though there be not wanting even now auroral blushes of the rising of a brighter day.

With electricty, the new found power chained to the car of human progress, with the atmosphere, steam and other gaseous forces performing each its manifold duties under man's guiding hand; with earth and water yielding hitherto unknown elements and compounds effecting under the transforming alchemy of the human intellect, almost infinite, and truly marvellous results, it is not saying too much when we say that year by year will develop in preventive medicine defences so strong that with reason we may hope to behold an euthanasia as glorious and to see man's life accomplish its cycle as complete as when autumnal leaves untouched by frost fall to the ground glowing with the ruddy hues which mark a complete life.

Respectively submitted,

PETER H. BRYCE, M.D.,
Secretary.

PART II.

SPECIAL REPORTS.

REPORT OF DELEGATE TO INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY: LONDON, 1892.

To the Members of the Provincial Board of Health:

GENTLEMEN,—It will doubtless be interesting to you to listen to a report of the work done at the International Congress of Hygiene and Demography, which met in London from August 10th to 17th, inclusive.

I hope I may be permitted to premise by saying that by demography is understood the study of the life conditions of communities from statistical points of view. As you are aware, six congresses have already been held: at Brussels, Paris, Turin, Geneva, the Hague and Vienna. You recollect the very full report given of the Congress at Geneva by our colleague, Dr. Ogden, which appears in the Annual Report for 1883.

The Seventh Congress was inaugurated on Monday 10th of August, at half-past three in the afternoon by a general meeting in St. James Hall, the chair having been taken by H. R. H. the Prince of Wales. About 2,300 persons, many of them ladies, were present. Sir Douglas Galton having presented the report of the Permanent International Committee, the Prince of Wales proceeded to read the presidential address.

Premising by expressing the pleasure it gave him to preside, and thanking the members, more particularly those who came from a distance for their attendance, he alluded to the importance of the meeting as shown by the list of its officers, both honorary and active. He then alluded to the knowledge he had acquired of the benefits arising from sanitary methods, when he was a member of the Royal Commission on the dwellings of the working classes; and expressed his satisfaction, that the registers of the country bore witness to the decreasing mortality in the large towns, to the increasing length of life in the whole population, and to many facts proving the great influence of sanitary institutions. He expressed the hope that the deliberations of the Congress being free from general or municipal politics, would exercise such an influence on public opinion as to induce individuals to submit to changes, which appeared inconvenient or injurious to them, because they would be really beneficial to the general community.

He hoped that the influence of the Congress would reach all people and all classes: for while the heavier penalties of insanitary arrangements fall on the poor, who are themselves least able to bear or prevent them, yet no class is free from their dangers or sufficiently careful to avert them.

Dr. Brouardel (President du Comite Consultatif d'Hygiene Publique de France, Doyen de la Faculte de Medicine, Paris) replied in French on behalf of the French delegates.

Dr. Von Coler, Director General of the Medical Department of the Prussian Army replied in German for the German Government.

Professor Corradi of Pavia replied in Italian for the Italian Government. Dr. Roth of the German Army spoke on behalf of the German Committee of the Congress. Herr Joseph Korosi, Director of Municipal Statistics, Budapest, in his reply dealt principally with the condition of statistical demography, the origin of which he ascribed to England.

Sir James Paget dealt with the mischievous fallacy that some of the subjects set down might seem of little utility. He showed that brilliant practical results were sometimes obtained from most unpromising fields of labour. The discoveries of Pasteur which had afforded facts and lessons of the highest practical importance to medicine and hygiene, grew out of his study of alcoholic fermentation. It was curious to reflect that the study of a process, which was responsible for so large a part of the disease and of the suffering of the human race, had resulted in discoveries which had done so much to diminish the sum of suffering among men and animals. Much had been done in England by the Medical Department of the Local Government Board, but much remained to be done. He hoped that the voice of this Congress would make it clear to every Government in the world, that it was part of its duty to promote the cultivation of the deepest scientific research, as much as it was to promote the ordinary routine work necessitated by sanitary progress. He concluded by moving a vote of thanks to the Prince of Wales for presiding. Dr. George Buchanan (Chief Medical Officer to the Local Government Board) said he would not detain the meeting long in seconding the resolution, which reflected the opinion of everyone present. The resolution was then put by Sir James Paget, and carried by acclamation.

The Prince of Wales in reply thanked Sir James Paget for his courteous words and expressed the interest he felt in the addresses which had fallen from the lips of the distinguished foreign delegates who had addressed them. He congratulated the Congress on the large attendance of delegates, particularly from abroad, and hoped that the interchange of ideas between Englishmen and their friends on the matters of importance to be discussed would, if a just conclusion could be reached, benefit not only England and English cities, but other countries

also, by introducing such sanitary measures as tend to decrease disease throughout the world. Should this result be attained, he said, we shall not have lost time in the work which we are going through this week.

The Prince of Wales spoke in an easy conversational style, and while not attempting more than generalties, produced a favorable impression. His manner is hearty, his voice strong and well modulated, his accent elegant without being markedly English, and the effect of his address satisfying. He certainly appears to have many of the qualities which go to make a man popular in this democratic age.

The sectional meetings took place on the 11th 12th, 13th and 14th of August, from 10 a.m. to 2 p.m. in the rooms of the Royal and other learned societies at Burlington House, Piccadilly, at the University of London, Burlington Gardens, and the Royal School of Mines, Jermyn St. Section 1, hygiene, was presided over by Sir Joseph Fayrer. Section 2, bacteriology, by Sir Joseph Lister. Section 3, relations of the disease of animals to those of man, by Sir Nigel Kingscote. Section 4, infancy, childhood, and school life, by Rev. Joseph Diggle, M.A., Chairman of the London School Board. Section 5, chemistry and physics in relation to hygiene, by Sir W. E. Roscoe. Section 6, architecture in relation to hygiene by Sir Arthur W. Blomfield. Section 7, engineering in relation to hygiene, by Sir John Coode. Section 8, naval and military hygiene, by Lord Wantage. Section 9, state hygiene, by Lord Basing. Division 2, or demography, was presided over by Mr. Francis Galton.

A full report of the papers read, and the subsequent discussions which took place in the several sections would require several volumes, there being in all, 249 papers. I may say that my attention was confined almost entirely to the department of State Hygiene, and the remarks which I am about to make will necessarily refer to what took place in that section.

The Right Hon. Lord Basing opened the proceedings by reading the President's address. He said that, though he made no pretensions to the character of an expert, he had great pleasure in accepting the presidency of this section: having when President of the Local Government Board, been associated with the growth, of our sanitary legislation and administration, "such as it was." England had never any complete code,—our system had grown and ripened from experience, beginning with the grant of special powers to the greater municipal authorities, especially that of borrowing money for public work, and ending with general Acts conferring like powers on all local authorities. He traced the progress of sanitary legislation from 1832 to the present time: observing how each successive visitation of cholera had given a fresh impulse to public opinion, and referred to the services of the late Sir E. Chadwick, and Sir John Simon. His own connection with the work dated from the passing of the Public Health Act of 1875, the first attempt at a codification of the law for the whole country, with the exception of London, which had to wait until the present session.

England had now in the President of the Local Government Board a Minister of Health in spirit if not in name, assisted by a body of able experts, and he was inclined to prefer the existing association of the Poor Law and Public Health services to the separation advocated by some. The British public was opposed to anything that savoured of bureaucracy, and, however desirable from a scientific point of view, Parliament would not concede further centralisation, assuming the sufficiency of local administration: but he, as a statesman, was in favor of compromise, being convinced that decentralisation was not applicable to those departments of administration that demanded uniformity, and were more or less unpopular. State control was thus indispensable in the cases alike of poor-law and sanitary administration: in the former he was convinced that it could not even now be relaxed, and without it we should never have attained the progress or the results that we had. The unwillingness of the county councils to appoint medical officers of health and to assume the control of the sanitary supervision, of the counties afforded evidence of this, as did the unsatisfactory character of the clause in the Act which conferred on them permissive powers. Indeed, he did not think that the time had yet arrived to hand this control over to them, and, as the *Times* recently observed, patience was the great need of all reformers.

Dr. Duddfield, in proposing a vote of thanks to the president, observed that had he, as Mr. Sclater-Booth, had his own way, London would have waited not sixteen, but only two years for a consolidation of its sanitary acts.

The motion was seconded by Dr. Littlejohn, who referred humorously to Lord Palmerston's celebrated reply to the Edinburgh Presbytery on the right way of averting the visitation of cholera in 1853.

Organisation of Local Boards of Health.

Dr. Simon (Breslau) then read in English a paper on the organisation of local boards of health, which he maintained should be distinct from, though subject to, those of local self-government, and under the direction of a physician giving his whole time to the work. In towns with over 300,000 inhabitants there should be several such boards, identical in constitution, but under the direction of one central board and its chief. Each board should be divided

into sections dealing respectively with, (1) sewerage, water supply and public and private buildings; (2) food supply and adulteration, with, if possible, a bacteriological station; (3) the notification and repression of infectious diseases, and the hygiene of dwellings and schools; and (4) vital and nosological statistics.

Dr. Willoughby, while observing that Dr. Simon approved of the subordination of sanitary to local administration, subject to state control, wished to direct special attention to his other position that the boards of health should be composed more or less of experts. This idea, familiar enough to Americans seemed never to have entered the heads of English people. So long as the sanitary authority was identical with, or was constituted of a mere sub-committee of the local board, little or no real progress could be hoped for. It was owing to the fact that the so-called sanitary authorities were composed of men always ignorant of the laws of health, often opposed to improvement, and not seldom themselves the greatest offenders, that the River Pollution Acts were a dead letter in the manufacturing districts, and that such difficulties were met with in dealing with insanitary dwellings in towns. Boards of health, however elected, should be composed of experts and distinct from, though subordinate to, the local governing bodies.

Dr. Cassidy, Chairman of the Provincial Board of Health Ontario) read a paper on "Sanitary legislation in Ontario for the prevention of epidemic, endemic, epizootic and other contagious diseases. This paper passed in review the whole field of sanitary legislation in this Province from the time of the establishment of the Provincial Board of Health to the present day. The composition of the board, its bacteriological laboratory, and the existence of 576 local boards with 356 medical health officers were alluded to. Attention was also drawn to the regulations respecting vaccination, the use of bovine lymph, and the vaccine farm at Palmerston. The published rules of this board intended to restrict the spread of infectious diseases were also given.

Dr. Covernton, member of this board followed with some remarks showing the benefits which resulted from extending the powers of this board over the municipalities, as was evident during the small-pox epidemic at Montreal in 1885.

Dr. Prince, Boston, Mass., wished to know if compulsory notification was a success in Ontario, and hinted that in Boston physicians neglected to notify the health authorities when they wished to continue their attendance and make fees.

A lay gentleman asked if there was any legislation in Ontario obliging physicians to disinfect themselves. Dr. Whitesides of Belfast, Ireland, stated that there was no small-pox hospital in Belfast and wished to know what should be done with a well-to-do person affected with small-pox.

In reply to Dr. Prince, Dr. Cassidy said that Ontario physicians observed the law of notification. In reply to the layman he stated, that in Ontario physicians had been largely the prime movers in introducing sanitary reforms, and it had not been thought necessary to provide special rules for their disinfection. He thought that they generally attended to that, and were a law to themselves. In reply to Dr. Whitesides, he advised the construction of a small-pox hospital at Belfast, and stated that until such a provision were made, isolation could be practised in a hospital tent or the patient's own house, if the other members of the family vacated it.

Sanitary Administration in Dublin.

Sir C. Cameron next read an account of ten years' experience in Dublin, where he held a position of authority unique among medical officers of health. Nowhere, perhaps, had the internal migration of the better classes and the conversion of their houses into tenements been more productive of insanitary conditions. Even now, of 54,000 families, 32,000 occupied 3,000 houses, and 22,000 the remaining 10,000. The former had on an average but one room and a half. Extensive demolition and though to a less extent reconstruction had been effected, the total cost of the improvements having been over £600,000; but the results were most satisfactory, the general death-rate having been reduced by 14 and the zymotic by 45 per cent. Typhus fever had almost disappeared. The mean corrected death-rate for the whole district, with 357,000 inhabitants, was 26.3.

The State, and Scientific Investigation.

Drs. Tomkins and Wright then read papers on the duties of the State to undertake scientific investigations, and to provide and support laboratories for hygienic and pathological research; but time forbade anything like a fair consideration of the subject by the meeting.

WEDNESDAY, August 12th.

The chair was occupied successively by Drs. Ed. Ritter von Hoffmann and W. P. Ruijsch.

STATE CONTROL OF THE DWELLINGS OF THE PEOPLE.

Dr. Elgin Gould read a paper on state control of the dwellings of the people, in which he urged the advantages of systematic inspection and supervision, as practised in the State and City of New York, over neglect in the first instance, and demolition when the conditions became insufferable. The results had been a reduction of the general death-rate from 29 to 24 per 1,000 within the last ten years, and the significance of this reduction was the more striking in that it had been effected concurrently with a considerable increase in the proportion of the population belonging to the working and poorer classes. He preferred relying on systematic inspection of all houses let in tenements, to more than one or two families, to dependence on complaints from private persons. Where all houses alike were thus inspected no jealousy or class prejudices were provoked, and the registration of the conditions of all houses as they were erected was infinitely preferable to leaving the discovery of defects to the chances of illness or death.

Mr. Hamer, of the Mansion House Council on the dwellings of the poor, followed with a paper on the homes of the poor. The connection between insanitary dwellings, ill-health, and a low state of morals was, he maintained, even more close than that between ignorance and crime, and the pecuniary value of life and health was now so generally recognised that he hoped that these claims would not much longer be treated as secondary to the so-called rights of property. Great as were the benefits accruing from local self-government, there were some matters of such vital importance that they could not be left to local caprice, but must be controlled by the State, that is, by the nation as a whole. Such were health and education; and fresh air and pure water were factors in the former which ought not to be made the objects of commercial monopoly or profit. The reduction in the general death-rate afforded evidence of an improvement in the condition of the masses, but a drive from the city to Tottenham would show that, side by side with the improvement of the older districts, a mass of jerry-built houses, he might say of suburban slums, were growing up which would be a source of danger in the future. As a part of this control, medical officers of health should be state servants and not subject to the owners of property or the local boards, while the whole sanitary administration should be under a Minister of Health.

Dr Theodore Thompson, in a paper on the same question, said that the poor everywhere might be divided into two classes: (1), those who, though with a struggle, maintained a decent existence; and (2) the loafers, drunkards, and criminal classes. The former were often fairly comfortable, but laboured under the burden of excessive rents. These required treatment differing in several respects.

The existing laws, were however, not enforced as they might be, and the man on whom so much depended was too often ill paid and insecure in his office. But even if he were competent and independent, the law itself was not free from grave defects; for example, a sewer ventilating into a dwelling-house was not a nuisance within the definition of Clause 9 of the Public Health Act. Nor was the housing of the Working Classes Act by any means perfect. Several economic difficulties attended its execution; for the workman must be near his work and to a food market, and this was a cause of much overcrowding, which could only be obviated by higher wages, facilities for travel, and lower rents.

Mr. Burroughs's paper dealt mainly with the question of ground rents, and

Mr. Rutherford followed with one urging the expediency of the sanitary registration of public and semi-public buildings by the certificates of competent persons.

In the discussion on the foregoing papers, Dr. Pankhurst said that there was no den so noisome for which rent would not always be obtained; that there was no city in which "unhealthy areas" could not be indicated, or the demolition and acquisition of which could not without much difficulty be secured by an energetic medical officer of health, and that this procedure had been greatly facilitated by the Housing Act. But people who would live in dens, because they were cheap, should be compelled to live in decent dwellings under stringent supervision and discipline at low rates, or even at none at all. It would be a grand education if in each area acquired a portion were thus appropriated, and it would be desirable that under such circumstances the rates should be wholly or partly remitted on compliance with certain conditions of sanitary construction and regulation.

Dr. Louis Parke believed, that local authorities generally showed a better appreciation of their obligations, and he would prefer that responsibility should devolve on the county councils than on the Local Government Board, which, ignorant of local needs and circumstances, was inclined to measure the sanitary requirements of municipalities by the population alone on the principle of the rule-of-three. He maintained that all tenement houses should be inspected several times a year, also schools and similar establishments. It was a great defect that sum-

summonses for sanitary offences were heard by the police magistrates who had no special knowledge — a procedure which led to much delay. He would have a court in all large towns for the hearing of such cases, as well as summonses under the Adulteration Acts, the magistrate in which would soon become an expert in these matters. The building Acts called for amendment; he himself hesitated to condemn many two-story dwellings lest they should be succeeded by huge blocks deficient in air and light. Such, as well as the suburban jerry-built houses, which were dilapidated in three or four years, constituted a great danger to the public health in the near future.

After some remarks by Mr. Mark Judge, Mrs. Sheldon Amos, and Mr. Hugh Alexander, Dr. E. Gould replied, and gave an account of the sanitary administration in New York State. There the powers conferred on the municipal boards of health were proportioned to the respective populations of the towns, and the inspectors were partly experts and partly police officials. The erection of every house, of whatever class, was supervised by the technical officials of the Board at every stage, and all plans and specifications open to public inspection at the office. The water supply could not be connected until the plumbing was certified as perfectly satisfactory, and all houses were subsequently inspected from two to six times a year.

Physical limits to the extension of the city necessitated lofty blocks, but the strictest provision was made to ensure adequate ventilation and light.

Alkali Works.

Mr. Fletcher read a paper on the progress of legislation in respect of emanations from alkali and chemical works, in which he pointed out the inapplicability of the common law of the land in consequence of the difficulty of assessing the damage or fixing the responsibility on any particular factory and the consequent need for preventive enactments.

Adulteration.

Dr. Von Hamel Roos urged the necessity of some international agreement as to what constituted adulteration, an article which was permitted to be sold in one country being liable to seizure when exposed in another.

Sale of Poisons.

Dr. Danford Thomas treated of the sale of poisons, whether as such or in the concealed form of proprietary medicines, and gave a sketch of the law on the subject in the chief countries of Europe. He observed that the records of the coroners' courts took no cognizance of non-fatal cases of poisoning, and that numerous poisons, some of which were favorite means of suicide as carbolic acid, were freely sold by oilmen, etc., or like cyanide of potassium, could be had without any precautions of wholesale dealers. He suggested that all proprietary medicines should be really patented, when their nature and composition would be known to all.

Thursday, August 13th.

Cremation.

A very crowded meeting assembled to hear the discussion on the best methods of the disposal of the dead. The leading papers on either side were read respectively by Sir Henry Thompson, and Mr. Seymour Haden. Sir Henry Thompson advocated especially cremation, and Mr. Seymour Haden his well-known method of perishable coffins. The discussion was maintained by many able speakers, and was throughout lively and well sustained. It ended, however, by the passing, by a very large and crowded audience, of a resolution proposed by Sir Henry Thompson, and seconded by Mr. Ernest Hart, "That the cremation of the dead is a rational and hygienic process, and one which is especially called for where death occurs from contagious diseases." This was carried with only four dissentients.

Education of Architects, Sanitary Inspectors, Etc.

Mr. Howard Seth Smith advocated the examination and registration of all architects in opposition to those who took what might be called the "fine arts" view of the provision.

Mr. Cates, F.R.I.B.A., defended the system of voluntary examination adopted by the Association of British Architects. Mr. Mark Judge was in favor of statutory examination of all candidates for appointments as district surveyers, and a resolution to that effect was carried almost unanimously.

The necessity for the examination and registration of plumbers was urged by the Master of the Company, by Mr. Anderson (President of the Association of Operative Plumbers), by Dr. Hill of Birmingham, Mr. Mark Judge and others.

Dr. Hill, Professors Hay and Garnett, Mason, Anderson, Buchan and others testified to the rapidly increasing favor of these diplomas throughout the trade.

Dr. Reid read a paper on the education, training and status of sanitary inspectors, whose functions he compared with those of the police. Mr. Hugh Alexander, President of the Association of Sanitary Inspectors, gave an account of the origin and progress of this body of officials.

The recommendations contained in these papers were embodied in a comprehensive resolution moved by the readers and carried with a single dissentient. Mr. H. N. Mozley, M.A., Camb., Barrister-at-law representing the "Personal Rights Association" on behalf of which he opposed every resolution proposed in this section.

FRIDAY, August 14th.

NOTIFICATION OF INFECTIOUS DISEASES.

Dr. Boobbyer read a paper on compulsory notification of infectious diseases. The single system adopted in very few towns was a complete failure, tempting concealment or neglect of medical advice. The dual system, in which practically the medical attendant certified the nature of the disease and relieved the householder of the trouble was the most successful. The results of prompt notification were seen in the immediate suppression of small-pox at Leicester, and the consequences of its absence in the epidemic at Sheffield.

Mr. Murphy, Dr. Hewitt (Minnesota), Dr. Coverntom (Toronto), Dr. Sergeant and others joined in the discussion.

Mr. Biddle read a paper to which were appended tables of statistics intending to demonstrate the failure of notification, which he also denounced, on ethical grounds, as transforming the confidential medical friends into a common informer.

Dr. Cameron Spottiswoode maintained that though Mr. Biddle's facts were accurate as far as they represented the total zymotic mortalities reported by the Registrar-General, they were misleading, since they did not distinguish between notified and non-notified diseases of the zymotic class, nor between the periods during which the power of notifying had and had not been exercised. Measles, for example, swelled the zymotic mortality, but had only very recently been notified in one or two towns.

It having been insinuated that the fee was an inducement to reckless notification Dr. Simon, Breslau, Dr. Coverntom, Toronto, and Dr. Ewing, New York, stated that neither in Germany, Canada, nor the United States was any payment made for notification.

The discussion having been continued by a number of speakers on each side, Dr. Martin, Paris, and others proposed resolutions that compulsory notification of infectious diseases was desirable and that it was best effected by the dual system. Both were carried by overwhelming majorities.

CONTAGIOUS DISEASES ACTS.

Dr. Birkbeck Nevins read two papers on this question, which were discussed by Mr. Holroyde (Chatham), Mrs. Butler, Surgeon Major Pringle, and a number of other speakers, the general feeling being that apart from the question of morality, social inequalities and difficulties of diagnosis rendered the Acts practically inoperative.

OTHER PAPERS.

Papers were also read by Dr. Newsholme, on the Teaching of the Laws of Health in Schools; by Miss Margaret E. Scott, on Woman's Work in promoting the cause of hygiene; by Professor Corradi, on the Means for Checking the Prevalence of Phthisis, and by Dr. Villanova, on Sanitary Progress in Spain.

CONGRESS HOSPITALITIES.

The British reputation for hospitality was well maintained during the week.

The corporation of the city of London entertained the members of the Congress at a conversazione at the Guildhall. The whole of the fine and ancient building was decorated picturesquely and filled with objects of art, among which the most interesting was the magnificent display of old plate of the city companies. A very largely attended conversazione was also given at the Hunterian Museum of the Royal College of Surgeons. Baroness and Mr. Burdett-Coutts gave a garden party at Holly Lodge, Highgate, which was very largely attended. There were also many other interesting amusements of a private and public character.

A handbook to London was presented to all the members of the Congress, the English and French versions appearing side by side on the same page. The information supplied was of a very practical character, and the maps were of great assistance to those unfamiliar with London.

Throughout the week the Medical Officers of Health Society published a special daily number of "Public Health," which gave excellent reports of the meetings, discussions, social gatherings and excursions. It was edited by Mr. Winter Blyth and was an exceedingly creditable and valuable production affording every day a review of the proceedings.

On Monday, August 17th, the proceedings of the Congress were formally brought to a close, by a general meeting held under the presidency of Sir Douglas Galton, in the theatre of the University of London. It was announced that the next meeting would take place in Budapesth in 1894. The total number of delegates, who attended the Congress was just over 2,700.

All of which is respectfully submitted,

J. J. CASSIDY.

QUARTERLY REPORT OF THE SECRETARY *re* WATER SUPPLIES AND DIPHTHERIA.

NOVEMBER 19th, 1891.

To the Chairman and Members of the Provincial Board of Health:

GENTLEMEN,—In the following report I desire to bring to your attention some of the more important matters which have required special attention during the past quarter.

I am pleased to be able to inform you that there is a prospect that the pollution of the Thames at London, Ontario, which some years ago required action on the part of this Board, will shortly be remedied by the construction of a trunk sewer, the disposal of the sewage on a sewage farm some distance below the city, and by the extension of the general sewerage system of the city, with an intercepting sewer by which the several sewers now polluting the river will be conducted to the main trunk sewer.

The sewerage works at Brantford and Berlin, both being constructed on the separate system, are being rapidly pushed forward and will when completed, be evidence of the advanced views which Ontario municipalities are displaying with regard to the disposal of sewage; as in both cases the sewage will be disposed of on sewage farms, where the sewage will be filtered.

The town of Barrie has also during the past year constructed several miles of separate sewers, and the system is being gradually extended along the lines of a comprehensive plan, by either petitions or on the recommendation of the Local Board of Health on sanitary grounds.

The city of Guelph is about to introduce a by-law for the construction of a sewerage system, and plans are likely to be submitted to this Board for approval before many months.

The towns of Windsor and Walkerville have not yet come to an amicable arrangement with regard to conjoint action in the matter of sewerage and water supply reported on at the second quarterly meeting this year. The matter may be said to have made some progress as Windsor is protecting itself against an injunction by Sandwich since it has arranged to supply Sandwich with water at a low rate. As Windsor and Walkerville boundaries touch, it is manifest that a similar agreement with regard to a water supply is desirable, while it would remove the difficulty now existing, owing to the main sewer of Walkerville polluting the Detroit river within three thousand feet above the Windsor intake pipe.

The town of Chatham has again been visited by me in order to inspect a new series of artesian wells some four miles distant which have been found to supply water at the rate of 300 gallons per minute in some cases from a single boring. The water according to various analyses has an excess of chlorides, but is in every way likely to prove a sanitary water of good quality.

The topography of the country will make the disposal of sewage in any other way than into the River Thames a practical difficulty; but as there are no other towns below it on the river there seems to be no objection to this so long as the river water is not used for drinking purposes. Some difficulty has been raised by the town against a township drain entering the river near the waterworks intake-pipe, owing to this drain passing through a growing suburb, making it likely to be used as a sewer. Danger from this source will likely be averted by the town utilising artesian instead of river water for public purposes.

The Hyatt filters in use at St. Thomas have been several times inspected and samples of water have been examined in the laboratory to test the capacity of these filters for removing bacteria. While to a considerable extent satisfactory, there are various improvements demanded before the Board can feel itself free to recommend this class of filters to municipalities for adoption.

The town of Peterborough has taken some steps toward the introduction of a sewerage system, which the growing density of population in the main business portion is causing to be urgently required if the town is to keep abreast of the marked progress in municipal sanitation which is becoming the gauge of the desirability of a town as a place for attracting new business enterprises.

The town of West Toronto has advertised for tenders for the construction of certain portions of the sewerage system submitted to the Board for approval at its May meeting. An agreement is likely to be arrived at whereby the scheme approved of by this Board for draining in to the Toronto Garrison Creek sewer will be carried out.

The problem of the disposal of Toronto sewage by an intercepting trunk sewer is being worked out, and a scheme is likely to be soon laid before the council for consideration. Owing to the memorial addressed to this Board, to the Board of Trade, and the City Council by the Canadian Institute, the various memorialized bodies met in the early summer, and after considering the subject, laid out a plan of operations for the study of the lake currents in the bay and lake front. That portion of it undertaken by your Board has included an extended series of bacteriological examinations of the water taken at many points, and under varying conditions of temperature and currents. The various sub-committees of the works are now arranging their data, and a conjoint report of much interest may be expected for submission to the next quarterly meeting of this board.

Water Supplies.

The unusual character of the season during the past three months has brought into special prominence the qualities of the water supply in all portions of the Province, and has enabled more or less careful observation to be made upon its relations to typhoid prevalence. It has long been believed and known that well water at this season of the year, where polluted is very liable to produce the disease, and it has generally been believed that public supplies from a sewage polluted lake or river would produce the same. While the regular staff of the office of the Board is insufficient to carry on extensive detailed investigations on these points, several facts have occurred to lend proof to the old belief. For instance in Barrie where a more than usual number of cases for that town have occurred, they are almost all on premises still supplied with well water, and curiously, almost all in a section of the town thinly populated, but where the wells were shallow and in a very porous bed of sand.

In all cases these wells were near the kitchen door, and generally within fifty feet of the privy. Where the town water is taken I believe but two cases had occurred

Again, I am informed by the Medical Health Officer of Brantford, that although every house is not yet supplied with the public water, yet the more general use of city water and the steady abolition of privy-pits has caused the number of cases to be scarcely more than 50 per cent. of that last year, although this season has been more than usually favorable, owing to its high temperature, to the prevalence of typhoid.

The Massachusetts Annual Report just received give some remarkable confirmatory evidence of these points. It states :

"The highest death-rates by typhoid fever in the State are not in the cities, but are in the towns that depend for water upon wells. The five towns highest on the list for the past 18 years have an average death-rate of 12.82 per year for each 10,000 inhabitants: while the five cities having the highest death-rate by typhoid fever, in the past 12 years average 7.65 per 10,000, and the average for all of the cities of that State, in the same time has been 4.62."

The two cities of Lowell and Lawrence having for several years shown an unusually high death-rate, the State Board made a detailed study of them and found remarkably conclusive evidence of the river water supply being the direct cause of the epidemics in these two cities, the cases being generally distributed within the area supplied by public water. It was found that Stony Brook, three miles above the intake-pipe of the Lowell waterworks had been polluted with fæces of typhoid patients: that a very few weeks after this there was a very rapid increase in deaths from typhoid in Lowell; and that these were in about six weeks followed by an alarming increase of typhoid deaths in Lawrence whose water supply is drawn from the Merrimac river nine miles down stream from where Lowell sewage enters the river, and typhoid germs were found in December in the water pipes of Lawrence.

The polluted water of Lowell could reach the Lawrence reservoir in eight hours, and direct experiment with water taken from the Lawrence waterpipes and kept by ice at a temperature as near freezing as possible, was found to maintain typhoid germs alive for at least twenty days.

With greater warmth and new nutriment it is apparent that there can be no absolute immunity through dilution, or low temperature wherever typhoid germs enter rivers or lakes. Prevalence of typhoid in Chicago this autumn may be considered a proof of the latter, and one per cent. of Toronto sewage water from the bay constantly entering the pipe causes one to wonder how long the simple expedient of putting the pumping station on the Island to prevent the ingress by suction of bay water is to be delayed.

Very notable progress has been made during the season in introducing public water to our smaller towns.

Galt has almost completed works giving what is likely to prove a first class supply.

Amherstburg is now pumping from the Detroit river, but with the example of Lowell and Lawrence nine miles apart, we can but watch with interest the progress of pollution of the Detroit river with the sewage of Detroit, Windsor and Walkerville, to see whether its volume will be sufficient to prevent danger to Amherstburg.

Essex Centre is progressing with its works from an artesian supply.

Georgetown is introducing an unusually pure spring creek supply; while Arnprior waters are at present under examination as to their suitability for a public supply.

I have received information by public advertisement that Parry Sound and North Bay are both to shortly vote on a by-law for public water. No plans or specifications have been forwarded to the office of the Board, but I have learned that strong opposition is expressed to the proposed point of supply at Parry Sound, as the pipe is to pass but a few hundred feet from the shore and at a point where the waters of the Seguin river laden with refuse from logs and sawmills are swept in a current along the shore. As any by-laws passed under the circumstances will be illegal, it will be for the Board to take action in the matter.

All the facts referred to, as also my observations in various places in the Province point out the desirability of the Board urging everywhere, not only the construction of public waterworks and of its exercising the closest supervision over the proposed sources of supply, but also of drawing the attention of Local Boards to the most prevalent cause of typhoid, viz: in well waters, and of urging upon them the duty of closing wells wherever public water supplies exist.

Diphtheria.

The appearance in epidemic form of diphtheria in Toronto, Guelph, French River, and various other places during the past season again makes it necessary to advert to its causes and method of spread. Doubtless organic matter in cellars, under foundations, in yards, privies, street excavations, block-pavements, etc., plays an important part; but everywhere the fact exists that by far the greater number of cases are due to direct infection from existing cases.

While in large houses with intelligent, trained nursing, isolation of patients is readily possible, it may be said that in small houses, with simply what help the mother can give, isolation is almost impossible. In the latter the disease spreads from child to child, not seldom to the nurse and those members forced to go to work aid in disseminating the disease, while children even though spared from taking it, do in many instances bear the infection directly to crowded school rooms, as these houses are seldom if ever properly disinfected.

I have in every instance as opportunity offered, urged isolation hospitals to which a child with its mother, if wished, can be taken to be attended by the family physician. This method has been in use in Guelph for several years, where in 1889, 62 per cent. of all cases were treated in hospital with a mortality of only 8.1 per cent.

Last summer for several weeks the two city hospitals of Guelph became crowded, and at my suggestion a large tent for convalescents was pitched on the lawn as I found that mild cases were returning home within ten days of the onset of the disease.

Barrie has just purchased a building for such hospital purposes, in which to place diphtheria which has appeared there also: and at French River I instituted there an isolation house for the reception of diphtheria.

I would recommend that the Board reconsider the Diphtheria Regulations adopted and published in 1886, and publish them in special form as an order of the Board to be followed in such cases.

The prevalence of this disease makes reference necessary to the demand for some systematic method of dealing with corpses dead of the disease.

I have at different times reported to the Board instances where cases of so-called croup, inflammation of the lungs, etc., have been proven to be diphtheria by outbreaks occurring at parts where the funerals have gone; but there exists a primary difficulty in dealing with these, owing to the fact that the law does not specifically direct that all cases of death be reported before burial to the Medical Health Officer. Until this is done the spread of disease in this manner by train will not be prevented

What is necessary is that Local Boards be by law in the position to examine before burial every death certificate, and that wherever any such certificate may cause the Medical Health Officer to find or suspect serious contagious disease, he may institute an investigation and take such steps *re* disinfection and private burial as will prevent outbreaks from such source.

All of which is respectfully submitted.

P. H. Bryce,
Secretary.

SECRETARY'S QUARTERLY REPORT *RE* ANIMAL DISEASES.

TORONTO, Nov. 19th, 1891.

To the Chairman and Members of the Provincial Board of Health:

GENTLEMEN,—The quarter's work has included, in addition to the many examinations of water for proposed town supplies and of well waters suspected of being the cause of contagious disease, the examination into outbreaks of disease which have occurred in animals in different parts of the Province. Reference was made at the last quarterly meeting to the serious outbreak of anthrax at Acton. It is pleasing to be able to state that no further cases have occurred there, and that the proprietors of the large tanneries have complied with the suggestions of your secretary and carried out the plans for filter-beds for filtering the effluent water from the tannery before its entrance into the creek. I regret to have learned, only by the merest accident, that some seven animals have died during the past summer on the flats below Guelph which became seeded with anthrax several years ago. It indicates not more the persistency of the germs of this malignant disease, than the necessity there is for the adoption of scientific methods for the disposal of sewage. Cattle have during the four past years been lost on these Guelph flats, aggregating a value of several thousand dollars, while the loss of pasturage has been of a serious character. It is to be hoped that the Guelph system of sewerage about to be initiated will soon remove this loss.

The other most serious cattle disease which has called for action on the part of the Board is actinomycosis. Specimens of suspected tissues have been forwarded from various districts, and in almost every instance biological examination has proved the disease to have been present. In one week six cattle were discovered in the Toronto cattle market suffering from this disease, and owing to a preliminary doubt as to the power of the Local Board of Health to deal with animals consigned for through shipment, which doubt has, however, been effectually removed by the decision of Police Magistrate Denison, I deemed it proper to take action as a provincial officer, and had four animals seized, two of which were destroyed in Montreal and one in Toronto. Bacteriological examination proved the nature of these cases. Other specimens have been received from Waterloo county, and from Lone Island Park, Man., and have been proved to be the same disease; while I have had information of the disease being in existence in various points in Western Canada, and one case even as far north as Parry Sound, and several places in Eastern Ontario. That the disease has increased in recent years is beyond question, and that its germs are capable of dissemination is not only proved from the occurrence of several cases in the same farmyard succeeding one another, but from the interesting fact that my assistant in the laboratory, Mr. J. J. Mackenzie, has succeeded, probably for the first time on this continent, in actually cultivating the microbe on agar-agar. It is to be hoped that these facts may not only be widely published throughout the Province, but also that the law as regards these and other scheduled diseases of animals may be made widely known.

There have been no specimens of tuberculous meat or udders sent for investigation, but this rather indicates the imperfect nature of the inspection of slaughter-houses and dairy-cows, than the absence of the disease. One serious outbreak in a herd of Jerseys was reported in the eastern part of the Province, while here and there I have learned of animals with diseased lungs having been put up for sale. Investigation in a systematic manner in the western stock-yards has revealed the fact that at least three per cent. of animals fed on the open prairies are tuberculous, and when this is true, and when exact examination reveals that from five to ten per cent. in different districts in Germany are tuberculous, we cannot doubt that in a country with as much stall-feeding as in this Province, the disease must be more or less prevalent. When it has been absolutely proven that milk from tuberculous udders contains numerous bacilli, and that even muscular tissue from tuberculous animals, though showing no tuberculous bacilli, when fed to guinea-pigs has produced the disease, it is high time that everywhere, but notably in our cities, the strictest inspection of dairy and slaughter cattle should be instituted. Professor McFadyean at the recent meeting of the Sanitary Association of Scotland, at Edinburgh, stated that probably twenty per cent. of the dairy cattle there at the present moment are affected with tuberculosis.

But more prevalent, though probably of less immediate danger as a human food, have been localised epidemics of hog-cholera. About the middle of August it became known to the health department of Toronto that some disease was rapidly carrying off hogs in several hog-feeding establishments about the city. After discussing the matter with me, Dr. Allan, the medical health officer, instituted a close inspection of several of the large hog-yards and found that it was the practice so soon as an animal seemed unwell to slaughter it and send the meat to market. As the disease is one for which compensation is given under the Animal Contagious Diseases Act, Canada Statutes, Cap. 68, 1886, I further suggested to Dr. Allan, in order that his work might be more effectual, as also that the owners of any animals condemned to be slaughtered might get

compensation, that he call in the services of Prof. Andrew Smith, V.S., the District Inspector under the above Act. Prof. Smith made an investigation of a number of pens, and I am given to understand could not state positively that the disease was hog-cholera. He suggested that it might be intestinal trouble, due to feeding hotel slops and offal in hot weather. Still the animals kept on dying, but only in pens where connection more or less evident with some previously sick hogs had been possible. East, north and west of the city outbreaks have, according to the best information, occurred. Other outbreaks amongst hogs have appeared in Simcoe County at Victoria Harbor, in Brant County at Burford, and in Frontenac County at Kingston Penitentiary and the Lunatic Asylum. I have understood that in no single case of these have the Inspectors under the Contagious Disease Act declared the disease hog-cholera. What was intestinal irritation in August is now called enteric (or typhoid) fever in November. Still the hogs keep on dying by scores in the same herds, even where they are fed on the best of grain food, and miles distant from the cities; but neither in the Toronto hogs, in the Victoria Harbor hogs, the Burford hogs, nor in the Asylum hogs, are we told that hog-cholera is present.

I have endeavored to obtain the clinical facts, and have got them from medical men who have seen Victoria Harbor hogs, Toronto hogs, Kingston hogs, and the prominent symptoms which mark hog-cholera, as described by the Veterinary Department of the Bureau of Animal Industry at Washington, have been present in every case.

But clinical symptoms may, in individual cases, be deceptive, though not probable to occur where the disease is in a whole herd. So I shall apply the most accurate test modern science knows, namely, the cultivation of the disease germ from the tissues of diseased animals. The work done on hog-cholera by Professor Salmon, of the Washington Bureau, and his assistants, is now classical, and the field has been recently worked over again by Professor Welch, of Johns Hopkins University, and the biological facts and the identity of the hog-cholera bacillus of Professor Salmon have been confirmed, and indeed are now everywhere accepted. In the recent outbreak in Ontario, cultures of tissues from blood, spleen, liver and lungs have been made, both in the Laboratory of the Board, and in that of the University Biological Department, from Toronto cases, Burford cases, and Kingston Asylum cases. Cultures may be seen in the Laboratory of the Board, wherein the macroscopic and microscopic appearances are identical with those found by Professor Salmon and Professor Welch, and that it is the germ of hog-cholera has been proved in the United States by reproduction of the disease through inoculation of the bacillus.

Can further evidence be needed, or is any further required? If so, then in at least three district outbreaks during the year, and in quite different sections of the country, I have been able to trace the infection from one or more primary centres.

I have dealt with these outbreaks somewhat in detail for two reasons, first, because the Public Health Act of Ontario requires all Medical Health Officers and Sanitary Inspectors to seize all unsound meat, and amongst others, animals suffering from hog-cholera; and it is manifest that if this Board does not hold a definite opinion regarding the nature of this disease amongst hogs, confessed by all, I believe, to be contagious, and is not prepared to maintain its opinions by biological evidences, then it has simply paralyzed prompt and effectual action on the part of 600 Local Boards of Health who may have to deal with the disease; and second, because by this Board being attached to the Department of Agriculture your Secretary has placed upon him, by Amendments to Sec. 99 of the Public Health Act, the investigation of Contagious Diseases in Animals.

It is not for this Board to discuss economic problems, but naturally the Minister of the Department takes a foremost interest in the maintenance of the high character of Ontario stock as regards the health thereof, and after having patiently beheld during the two past years the establishment every few months, in some new centre, of a disease which has proved its ability not only to exist, but even to spread rapidly in the severe weather of a Canadian winter, and which for a number of years past has been the direct cause of millions of dollars of annual loss to the farmers of the Western States, if I should continue to maintain a silence regarding it, I would feel that I had neglected my duty both as a health officer and as an officer of the Department of Agriculture. Accustomed to dealing with outbreaks of small-pox, diphtheria, etc., health officers understand perfectly that prompt isolation and disinfection are the only remedies for stamping out epidemic diseases; and if in addition to the utilization of both these, advantage be taken of the fact that surveillance of presumably infected animals during the period of incubation, and the prompt removal and slaughter of any showing signs of the disease is readily possible, it would be found that apart from the danger of new importation of the disease from the west, hog-cholera as a disease would not, within a few months, exist in the Province of Ontario.

Respectfully submitted,

P. H. BRYCE,
Secretary.

REPORT OF THE SECRETARY *RE* THE ACTON TANNERY.

To the Local Board of Health, Acton:

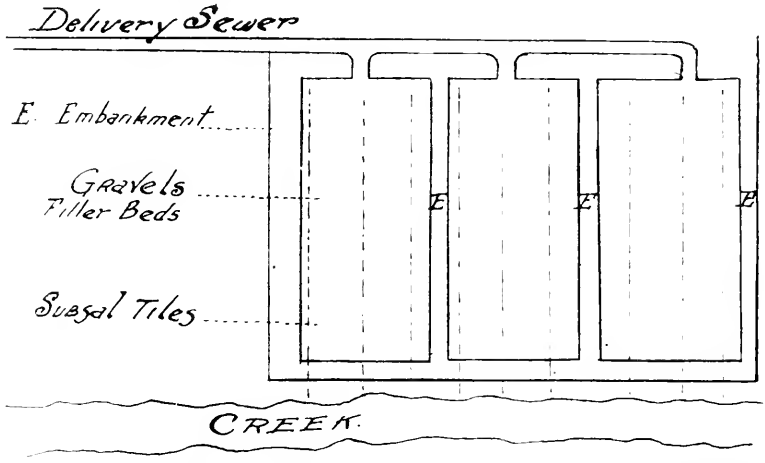
GENTLEMEN,—Having examined the tannery and the sources of the pollution of the creek running through the several farms below the village, I would as requested, make the following suggestions as being likely to greatly mitigate or remove the nuisance caused by pouring the waste water from the tannery into the creek.

1. For systematically dealing with the waste water, it is desirable that the volume of water to be treated be made as small as possible, by turning directly into the creek, the waters of the springs and all other waters which do become contaminated.

2. Convey as at present, the polluted water to the place where it is to be treated.

3. Have the area at present used for allowing the grosser materials in the polluted waters to settle, or as much more as may be found necessary, made into a series of flat beds, in a manner similar to that carried out in different places.

4. As to the extent of these required for performing the necessary work, it will depend on the volume of refuse water to be treated. But in the meantime I would suggest that the present area be first prepared for the reception of the sewage, by converting it into an oblong flat bed divided into three sections as in the following diagram:



The sides should be raised at least 18 inches above the level of the flat-bed, and be made of planking with present earth, or if preferred, with good clay, so that they will be strong and impervious banks. The ground of each flat-bed should have a series of two-inch tile drains laid at a depth of 2½ feet below the level of the flat-bed, and fifteen feet apart. The ground which is gravelly, should during the levelling be all carefully ploughed and sub-soiled so as to be made as porous as possible. On the levelled surface one foot of pure sharp sand, (coarse) or fine gravel will then be hauled. It is of the greatest importance that this filtering material contains no clay.

5. The beds having been thus completed, they will be ready for the treatment of the sewage in the following manner: On flat-bed No. 1 turn the sewage of 24 hours from the conduit by several gates and small carriers, which will deliver the sewage so as to evenly cover the whole filter-bed. Treat beds No. 2 and No. 3 similarly on the second and third days, returning to No. 1 on the fourth day, and so continuing the rotation. By this means each bed will have an intermittent filtration, and time to cleanse itself before being used again. It will filter the water rapidly downward and run purified from the tile drains, if they are kept above the clay.

6. On the side of the filter-beds towards the hill a deep ditch must be dug so as to carry all rain and soakage from the hillside away from the field to the creek direct.

7. Should it be found that the waste water has a notable acid reaction in the conduit, it will increase the rapidity and thoroughness of the purification if the refuse water before flowing on to the filter-bed be carried into a tank where it can be treated with an amount of milk of lime sufficient to neutralize the acid. A partial sedimentation will take place in the tank from which the upper water can be allowed to flow to the filter-bed. A pair of tanks to be used alternately would be necessary in this case, since from time to time the sediment would have to be removed.

In the meantime, however, I think it will be found that if the filter-beds be carefully constructed, that they will be equal to the necessities of the case.

I forward you a copy of the Annual Report of this Board in which the sewage farm at London Asylum is reported upon in detail, as also papers bearing on this subject found in the report of the Health Officers' meeting at Owen Sound.

I have made these suggestions unofficially in order that the matter complained of by the owners of lands along the creek may be arranged amicably with the owners of the tannery.

Should there be a neglect on the part of the latter to take prompt and early action, the regular steps to be taken for the abatement of the nuisance would have to be set in motion.

These are indicated in sections 64, 29, etc., of the Public Health Act, Cap. 205.

Of course actions for damages under common law, or an application for an injunction may be taken, but I trust that in a case where the remedy can be so readily applied as in this, the suggestions I have made will prove to be sufficient.

I have the honor to be,

Yours truly,

PETER H. BRYCE,
Secretary.

OFFICE OF PROVINCIAL BOARD OF HEALTH,

J. MURRAY, ESQ., TORONTO, Sept. 5th, 1891.
Sec. Local Board of Health,
Esquesing.

DEAR SIR, - Your communication of Sept. 4th has been received. In reply I take pleasure in forwarding to you a brief statement of the results of the laboratory investigation of specimens sent.

LABORATORY REPORT re SPECIMENS OF TISSUE FROM ACTON.

July 22nd. Flynn's first cow: undoubtedly anthrax both from microscopic examination of blood and from cultures of the microbe.

July 24th. Flynn's second cow; undoubtedly anthrax from the same evidence as first.

July 27th. Flynn's third cow; material in very bad state of putrefaction. Microscope however, showed bacilli, as also cultures.

July 29th. McPherson's horse: putrefaction advanced in specimen. Blood filled with anthrax spores. Bacilli had disappeared from blood. Plate cultures gave one or two colonies of the anthrax bacillus.

You will see that all the animals died from the same disease, and the fact that all these animals had fed on the flats along the creek below Acton, or in fields where infected animals had been buried shows that some common cause has been present. From the history of such outbreaks in Acton, as well as in other countries, there is little doubt as to the origin of the disease.

It is extremely probable that at some time, it may have been several years ago, but probably during the present year also, the germs of anthrax have been borne to the flats and deposited there or along the banks of the stream. It is probable that on some particular days germs of anthrax were actually present in the creek-water when drunk by animals.

In both cases the germs have been introduced into the system of the animal, and multiplying rapidly, have caused the disease so commonly fatal.

How dangerous it is may be judged from the fate of the pigs to which milk from a sick cow was given on the farm of Mr. Flynn, sr.

As to the probability of its recurrence, it may be said that the history of the disease is, that ground infected with it is dangerous to cattle feeding thereon for several years after infection This is especially true of these grounds, when they are eaten off close to the ground in dry seasons.

It hence is apparent that under any circumstances the flats infected should not be used for pasturage for several years except at times when the grass is long. It would be a proper thing for your Board to issue a positive order, preventing any milch cows from feeding on the flats during certain periods, according to the character of the season.

If owners chose to pasture horses or young cattle they might take the risk; but they must know that no animal could be sold therefrom until it has been proved by a fortnight's stay in another field to be perfectly healthy.

By section 99 of the Health Act your Board must punish with severest penalties anyone who sells the flesh, milk or hides of any animal dying of the disease.

These are the main points for your Board to consider and I trust that the Board will see that they are carried promptly into effect.

With regard to the prevention of the pollution of the stream from factory, tannery, or other refuse I have advised the Acton Board of Health and the owners of the tannery on the stream above. If the work carried out is not satisfactory to your Board, as also to that of Acton, it will be proper to apprise me of the fact.

I have the honor to be,

Your obedient servant.

PETER H. BRYCE,
Secretary.

REPORT OF THE SECRETARY *RE* STREETSVILLE CEMETERY.

TORONTO, February 4th, 1891.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—I have the honor to report that in accordance with the Public Health Act, I visited on February 3rd, 1891, the village of Streetsville for the purpose of inspecting the site of a proposed new cemetery for the village.

I found it situated on the brow of the north bank of the River Credit about half a mile from the village, which contains 800 inhabitants, and is situated on the south side of the river rather higher up than the proposed site. The site is a beautiful one, and easy of access by a bridge from the village, and is over 200 yards from the nearest house. The soil is largely composed of sand and gravel and will fulfil very well the purposes for which it is intended.

The only sanitary question which can arise in connection with the site is the possible danger which might arise from drainage into the river from it.

It would seem that no practical objection can be made on this ground as the stream is not likely to ever come into use as a public water supply for the village, it having equally convenient to it a spring creek (Mullet Creek) as well as springs along the river bank.

Below are several mill-dams, two near the village and one at Springfield, a small place four miles further down.

All of which is respectfully submitted,

PETER H. BRYCE,
Secretary.

REPORT OF NEUSTADT TANNERY.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—On August 12th, I visited Neustadt to investigate, on complaint of Dr. Niemeier, the tannery and the stream running through the village. Dr. McLean, Medical Health Officer for the Township of Normanby, met me at the station and took me over the village.

The stream in question is about 2 or 3 inches deep and 4 or 5 feet wide and enters the village on the south side, pursuing a course almost directly north and south through it passing out at the north side, being used there to supply water for a boiler of a steam saw-mill.

Just before entering the village it passes under a butter factory and the cans containing cream are washed into it. It then turns a short distance to the west and passes into the barn-yard going beneath it in a covered drain and coming out again at the north side of the yard.

The tannery uses entirely green Canadian hides which are first soaked in running water and then passed through the various baths used in the tannery process.

All the drainage from the tannery passes into the stream, which consists usually of the running water mentioned above, but may also include the contents of the spent vats. The scrapings of the hides are all burnt, but undoubtedly some of them must enter the stream.

Sixty feet north of the tannery and in the tannery-yard, is a privy under one side of which the stream runs. Adjoining this privy, to the west, is a stable and manure heap which is also close to the stream. Passing out of the tannery-yard the stream runs north-west and west

across a field, then crosses the road, turns north again and passing through the village, as shown on the map, is joined by another stream of the same size which comes from the south-west.

At the north of the village there is a saw-mill, and the water of the stream is slightly dammed in order to give sufficient depth for pumping water to the boiler.

The wells of the village are situate with one exception, quite a distance from the stream, (over fifty yards.) The one which is nearer than fifty yards is shown on the map near the Gottfred's house. It is about 20 feet from the stream and is 15 or 16 feet deep.

At the time of my visit there was no perceptible odor from the stream in the village, but it undoubtedly must be bad sometimes from the fact of the vats being emptied into it.

The only cases of sickness which I could get any account of were as follows :

At the post-office, shown on the accompanying diagram, there had been a case of what the attending physician, Dr. Brown, called inflammatory croup : he had used carbolic acid very freely as a disinfectant.

Shortly afterwards Mrs. Rudolph (patient of Dr. Niemeier), took diphtheria. Her house is shown across the street from the post-office. The only other case of diphtheria of which I could find any trace was Dr. Niemeier's grandson, who came to Neustadt on a visit and contracted the disease shortly after reaching there, but some time after the other two cases.

There had been two cases of typhoid fever in a house close to the stream and near the small dam mentioned above. The first case was a visitor in the house, who developed the disease thirteen days after her arrival there. The second case appeared eight weeks later. Dr. Brown, the attending physician, told me that he had ordered them to boil all their drinking water and to use disinfectants.

They had no well on the premises, but had to carry their water over seventy yards.

The butter factory has been in the place over two years and the tannery about twenty-five years.

It does not seem to me possible to trace the cases of diphtheria and typhoid either to the butter factory or the tannery, but in hot weather and when the vats of the latter are being turned into the stream, it must constitute a very considerable nuisance, and must always threaten danger to the village.

Especially I would call your attention to the privy in the tannery-yard, situated right over the stream, and the manure heap adjoining it.

I submit also two maps of the village and tannery-yard.

I have the honor to be,
Your obedient servant,

JOHN J. MACKENZIE.

REPORT TO THE SECRETARY *RE* THE ONTARIO VACCINE FARM AND THE DRAINAGE OF PALMERSTON.

SIR, —At your request, whilst inquiring into the tannery nuisance at Neustadt, I called upon Dr. Stewart of the Ontario Vaccine Farm at Palmerston.

Dr. Stewart's establishment is in Palmerston, a portion of his own barn and stable being set apart for vaccine production. A map of same is appended to this report.

The calves which he uses are procurred from the neighboring farmers for a small fee, no difficulty whatever being found in securing a sufficient number.

For the ordinary needs of the establishment one calf every three weeks is found quite sufficient.

Care is taken that the animals selected are in good condition and they are seldom over eight months old.

The animal is vaccinated on the inner side of the thigh and the pustules take about five days to develop.

When developed the pustules are broken and the points simply dipped into the lymph one by one, only those pustules being used from which there is a free flow of lymph. If a pustule shows a tendency to bleed it is left and no more lymph taken from it until the blood coagulates, which it soon does.

An animal may be used for two or three days as the pustules do not mature simultaneously over the whole surface, but by taking points only from those which are fresh and freely flowing the presence of putrefactive or septic germs is avoided. On an average a thousand points are obtained from each animal.

The points are placed in rows in a holder and allowed to dry in the operating-room or in the house, and as soon as dry are dipped in clear egg albumen, thus being covered with a layer which apparently protects them.

This addition of an albumen film Dr. Stewart has used for some time and finds it works admirably.

After drying, the points are placed in a refrigerator and kept there until shipped. The premises are clean but form part of the ordinary stable, one stall being reserved for the calves undergoing treatment. The operating-room is a small addition to one side of the stable separated from it by a door and having a window looking out on a garden.

The floor of the barn and stable are somewhat low, but Dr. Stewart purposes shortly putting in a new floor and raising it somewhat.

Whilst in Palmerston I was requested also to look into the subject of the town drainage.

The town possesses an ordinary wooden drain passing through the principal streets and into which the cellar drains from houses empty, none of them being trapped.

The drain from a woollen-mill also empties into this wooden structure, discharging into it about 150 barrels a day.

The wool used is Canadian unscoured wool and imported material ready scoured, from the Cape, Australia and East Indies.

The Canadian wool is not scoured thoroughly until made up into blankets, when it is treated with hot water and soap and then rinsed.

Dyed goods are dyed with logwood or aniline dyes, two of the latter, a red and a blue being used. The other chemicals used are bichromate of potash, copperas and sulphuric acid, all of which leave the mill by the drain in question and pass into the town drain.

The town drain opens upon the north side of the town upon a flat swampy tract of land where it is to a great extent dammed back by the railroad track.

The owner of this pasture states that one of his cows died last spring very suddenly and he attributes it to the animal drinking the water from the drain. He was unable, however, to describe the symptoms very accurately. Last spring also the drain became obstructed at one part of its course in consequence of which the cellars of all the houses above the point of obstruction were flooded with drainage from the woollen mill. There seems no doubt whatever that something ought to be done to remedy this evil, but the authorities are in trouble as to who is to blame, the council claiming that the owner of the woollen-mill which is the immediate cause is responsible, whilst the latter claims that as he received permission to use the town drain from the council, his responsibility ceases as soon as his drainage passes into it.

With the exception of the cow mentioned above I was unable to find any traces of disease resulting from this state of affairs, but all the conditions are extremely favorable for the propagation of disease if it once broke out and steps should be taken to prevent it.

I have the honor to be, Sir,
Your obedient servant,

JOHN J. MACKENZIE,
Analyst, Provincial Board of Health.

REPORT TO THE SECRETARY *RE* SANITATION IN LISTOWEL.

SIR,—August 13th, on receipt of your telegram, I drove from Palmerston to Listowel to look into the state of sanitary matters in that town.

It was, unfortunately, a holiday when I went there, and the mayor who is chairman of the Local Board was out of town. I called on Dr. Nichol, the Health Officer but could learn very little about the Board except that it had not met since his appointment at the beginning of the year.

I was unable to discover the name of secretary or of any of the other members.

Listowel has a waterworks system for fire purposes, the water being drawn from a small stream which passes through the town.

The same company which supplies the water for fire purposes are now putting in pipes for supplying some of the houses and the hotels with drinking water, the supply being taken from a well which has been in use for some time. The depth of the well is about fifteen feet and the water stands in it usually at five feet.

There is no regular system of drainage. The hotels have water-closets and drain into the river.

Just above the town there is a woollen-mill which I believe uses the same processes as the one in Palmerston and drains directly into the river.

I could hear of no special outbreaks of disease: the two medical men on whom I called both said there had not been more than the usual amount of diphtheria and typhoid during the year.

I have the honor to be, Sir,
Your obedient servant,

JOHN J. MACKENZIE,
Analyst, Provincial Board of Health.

CORRESPONDENCE *RE* DETROIT RIVER QUARANTINE INSPECTION.

The following correspondence relates to the outbreak of small pox in the autumn of 1891, referring especially to the action instituted by the Marine Hospital Service in the inspection of passengers entering the United States by way of Port Huron and Detroit.

CORRESPONDENCE *re* QUARANTINE INSPECTION AT SARNIA AND DETROIT.

LANSING, MICH., November 12th, 1892.

DR P. H. BRYCE,
Secretary Provincial Board of Health,
Toronto.

Small-pox Infected car side-tracked at Point Edward. Respectfully suggest disinfection.
(*Telegram*). HENRY B. BAKER.

LANSING, MICH., November 12th, 1892.

DR P. H. BRYCE,
Secretary Provincial Board,
Toronto.

Two cases small-pox at Port Huron. This morning returned into Canada.
(*Telegram*). HENRY B. BAKER.

TORONTO, NOV. 13th, 1891.

DR. HENRY BAKER,
LANSING, MICH.

Medical Health Officer of long experience at Sarnia reports both cases to be measles. Precautionary quarantine instituted.
(*Telegram*). P. H. BRYCE.

LANSING, MICH., NOV. 16th, 1891.

DR. P. H. BRYCE,
Secretary Provincial Board of Health,
Toronto.

In view of small-pox in five counties of Quebec, also ordinary dangerous diseases, and to emigration to Michigan and North-west, do you see any serious objection to inspection at Port Huron and Detroit.
(*Telegram*). HENRY B. BAKER.

The Secretary telegraphed to Dr. Baker from Port Elgin to the effect, that the cases of small-pox were mostly along the Baie de Chaleurs and no cases existed in Montreal; that he had the fullest confidence in the Quebec Provincial Board, and further inspection was undesirable, it being both unnecessary and injurious to commerce. Notwithstanding this telegram the Marine Hospital Service at Washington was requested to institute an inspection as seen from the following order.

TREASURY DEPARTMENT,
Office of the Supervising Surgeon-General,
Marine Hospital Service,
WASHINGTON, D.C., November 28th, 1891.

DOCTOR J. J. MULHERON,
U. S. Sanitary Inspector, M.H.S.,
Detroit, Michigan.

SIR,—You are hereby directed to inspect, at the port of Detroit, all immigrants and travellers bound for the United States and coming from the Counties of Bonaventure, Rimouski, Temiscouata, Gaspe, Sherbrooke, and Quebec in the Province of Quebec, or from any other place in that Province where small-pox is known to exist or may occur hereafter.

Persons suffering from small-pox or other dangerous contagious diseases will not be permitted to enter the United States.

Immigrants or travellers coming from the counties above mentioned, and who it is believed are likely to have been exposed to the contagion of small-pox, will not be permitted to enter the United States unless they can produce satisfactory evidence that they have had small-pox, or that they have been recently successfully vaccinated, or will permit of vaccination. You will vaccinate free of charge all unprotected persons coming from the Province of Quebec, where small-pox exists, or may hereafter occur.

The baggage of all persons coming from any infected district in the Province of Quebec, and believed to be infected, must be thoroughly disinfected before passing.

You will make weekly reports to this office of the work performed, which should include the number of persons excluded, number of persons vaccinated, number of pieces of baggage disinfected.

Respectfully yours,
(Signed) WALTER WYMAN.
Supervising Surgeon-General, M.H.S.

(Above was letter of instructions to the Inspector at Detroit.)

As a protest to the inspection thus instituted the following circular was sent out to the various State Boards of Health :—

TORONTO, November 25th, 1891.

To the President and Members of the State Board of Health of .

GENTLEMEN,—On the morning of the 12th of November, 1891, a telegram was received by the Secretary of the Provincial Board of Health of Ontario from Dr. Henry B. Baker, Secretary of the State Board of Health of Michigan, stating that two cases of small-pox had been detected on a Grand Trunk Railroad car at Port Huron, and had been returned to the Canadian side in said car, where they were isolated by the Grand Trunk Railway authorities.

The Secretary of this Board immediately telegraphed Dr. T. Johnston, an experienced physician and health officer of Sarnia, to examine into the facts of the case. He received a prompt answer by telegraph to the effect that the cases had already been seen by Dr. Johnston, and were without doubt measles. A letter followed stating that the cases of measles were in German immigrants who had landed in New York. (A rash had appeared on one child two days before landing at New York. There they were quarantined six days and allowed to proceed on their journey. On the twelfth of November a rash appeared on the second child while passing through Ontario. They were on their way to Dakota).

The cost of taking care of these cases of disease has not only been thrown upon an Ontario municipality, but their existence has been made the occasion upon which the Secretary of the Michigan State Board of Health has appealed to the Marine Hospital Service for inspectors to inspect trains passing into the United States from Ontario along the St Clair and Detroit Rivers. As a signatory to the resolutions adopted in 1886 at the Toronto meeting of the International Conference of State Boards, this Board has agreed to notify all other State Boards of the existence of small-pox in Ontario.

It is hardly necessary to state that as no such notices have been sent to other State Boards they are thereby assured that no cases of small-pox exist in Ontario, nor have, indeed, existed for two years. But it may further be stated, that with the exception of a single family at Sherbrooke, and one case at Levis, in the Province of Quebec, some 700 miles from the Michigan border, no cases exist within 1,000 miles of the international boundary on the west.

Remembering the way in which the first person caused the outbreak in Quebec by travelling on the train, and thereby causing the appearance of the disease at six centres, and that within ten weeks of the appearance of first cases, only twelve cases exist out of eighty-eight, nearly all of which were first exposures, this Board desires to state that it has had no fear that the disease would spread to this Province : first, because of the great distance away of the cases, and the fact that they are in a people who do not travel far from home ; and second, because of the vigilance of the Board of Health of the Province of Quebec. For these reasons this Board has not even deemed it necessary to inspect trains coming from Quebec into Ontario.

Now from these considerations this Board considers it apparent that the action taken by the State Board of Michigan which has led to the inspection instituted by the Marine Hospital Service is wholly uncalled for, and hence makes it necessary for this Board to request all State Boards, which view the facts stated as indicating satisfactory health conditions in Canada, to not only point out to the Chief Officer of the Marine Hospital Service that the intention of the arrangement entered into between State Boards of Health at the Toronto Conference of 1886 was to remove the necessity for such unnecessary and vexatious inspections, but also to urge in view of the facts, that any existing inspection be at once removed.

The unreasonableness of the inspection is further apparent when it is pointed out that during a period when in 1888, hundreds of cases of small-pox existed in Buffalo and vicinity, this Board deemed it necessary to have only one inspector stationed in Buffalo to keep it informed of the measures which were being taken by the health authorities there for stamping out the disease, and to keep Local Boards along the border on the alert for any cases that might pass over the river. But if anything were needed to enforce the argument it may be found in the fact that during the same year there were but fifty-four cases of small-pox, with three deaths, in Ontario, while in Michigan there were sixty cases and seventeen deaths, of which only three outbreaks are reported to have come from Canada (and all these grew out of the Buffalo epidemic); and yet Ontario did not dream of interrupting commerce and travel. To-day, with no cases in Ontario, for some unexplained reason we find an inspection instituted, with no results except to interrupt and injure the extensive commerce and railway interests between Ontario and the Western States.

If the comity which the establishment of the International Conference was intended to establish between the two countries, and between states and provinces, is to continue to exist, or to have any practical meaning, then this Board would appeal to all health authorities to express their views to the Chief Officer of the Marine Hospital Service in favor of a removal of an inspection as irritating as it is unnecessary.

P.S. Formal protests by telegram, herewith subjoined, have been received from the managers of the two main Trunk Lines of Canadian Railways.

MONTREAL, 25th November, 1891.

P. H. BRYCE,
Secretary Provincial Board of Health.

Last Report of Provincial Board of Health for Quebec stated no new cases had developed. The Eastern States have adopted stringent inspection to prevent passage of suspected persons. Our medical officers are fully advised, and I have every reason to believe that such precautions are taken that no infected persons can reach the West, and that the action of the United States officers is quite unnecessary.

L. J. SEARGEANT.

OTTAWA, ONT., November 25th, 1891.

DR. P. H. BRYCE,
Secretary Provincial Board of Health,
Toronto.

Press despatches from Washington indicate intention on the part of the United States authorities to put medical inspectors on Canadian trains at Windsor to guard against introduction of small-pox. This action is undoubtedly the result of erroneous information concerning prevalence of small-pox in Canada. I trust that you may by giving United States authorities correct information save our passengers from the annoyance of a disagreeable and unnecessary inspection. If I am correctly informed, small-pox has only been reported from the vicinity of the Gulf of St. Lawrence. An inspection against this at Windsor would be very like a Canadian inspection at Detroit against a disease prevailing on the Gulf of Mexico.

W. C. VAN HORNE.

(Signed) PETER H. BRYCE,
Secretary.

TREASURY DEPARTMENT,
Office of the Supervising Surgeon-General,
Marine Hospital Service,
WASHINGTON, D.C., November 30th, 1891.

PETER H. BRYCE, M.D.,
Secretary Provincial Board of Health of Ontario,
Toronto, Canada.

SIR,—I have the honor to acknowledge the receipt of your letter of the 26th instant, containing a printed circular issued by your Board, addressed to State Boards of Health, the purport of which is a protest against the establishment of inspection of trains passing into the United States from Canada at Detroit and Port Huron, and would respectfully state that the action taken by this Bureau has been based upon the reports received from the Provincial Board of Health of Quebec relative to an outbreak of small-pox along the Lower St. Lawrence River,

and upon requests for the inspection of trains crossing the river at Detroit and Port Huron, received from the Governor of Michigan, the State Boards of Health of Michigan, Minnesota, Wisconsin, and from the Commissioner of Health of the City of Chicago.

You will observe by the enclosed copy of instructions to our Inspector at Detroit, that the surveillance of passengers is only directed towards those coming from the counties in Quebec, where small-pox is known to exist, and not against Ontario, and that the interference with travel or commerce will be very slight, if any. I have also to inform you that an officer of this Service, P. A. Surgeon, Dr. S. C. Devan, will proceed to Montreal and confer with the Provincial Board of Health and make a full report to this Bureau.

The inspection service will be continued no longer than is considered necessary.

Respectfully yours,

WALTER WYMAN,
Supervising Surgeon-General, M.H.S.

MICHIGAN STATE BOARD OF HEALTH,
LANSING, MICH., November 28th, 1891.

To PETER H. BRYCE, M.D.,
Secretary Provincial Board of Health,
Toronto, Ontario.

DEAR DOCTOR,—Your circular letter of November 25th is before me, stating reasons why you have not notified the different State Boards, concerning the presence of small-pox in Ontario, as required by agreement. For this accept my thanks. Permit me to suggest, however, that your communication contains more than is required by the agreement of the Conference, or by the present circumstances. I do not understand that you are specially called upon, or competent to advise all the State Boards in the United States and neighbouring countries as to just what should be the action of the Michigan State Board of Health, or of its Secretary, in dealing with the interests of life and health of citizens under its care, in this particular case or in any case. My telegram to you before our action was taken in this instance asked you to advise this office on this subject: you did so, and I hereby thank you. Your advice was duly weighed, as also was other advice, and action has been taken. Permit me to suggest that your circular is late, is addressed to too many persons, and contains appearances of a great desire to favor railroad companies, but not so great concern for the safety of life and health in Michigan or states west of us.

You cite, as a model, the action or non-action of the Ontario Board of Health in 1888, when "hundreds of cases of small-pox existed in Buffalo and vicinity this Board deemed it necessary to have only one inspector stationed in Buffalo to keep it informed of the measures which were being taken by the health authorities there for stamping out the disease, and to keep Local Boards along the border on the alert for any cases that might pass over the river." The result seems to have been "fifty-four cases of small-pox with three deaths, in Ontario." Where does the responsibility rest for these cases and deaths? Would not a thorough inspection service between Buffalo and Ontario prevented them?

The sixty cases and seven deaths in Michigan in 1888, referred to by you, mostly resulted from the introduction of a case of varioloid from Dakota, in a way against which it is not probable that any inspection could have been effective. But it is possible that a thorough inspection service between Ontario and Michigan might have prevented a few of the cases in Michigan in 1888. Eleven cases and two deaths at Lansing were alleged to have resulted from "James Rowe coming from Sarnia, Canada." Two of the other outbreaks were reported as having come from the same source. It is now too late to remedy this; but perhaps it is not too late to stop a repetition.

While you are in error in supposing that the two cases of varioloid, returned to Canada November 12th, were the basis of the action for inspection, the health officer at Port Huron is positive that they were not measles, but varioloid, one of them having twenty or thirty pustules on the face, with "matter under the scabs."

I did not understand that the agreement for inter-state notification of dangerous diseases was entirely or mainly in the interest of railroads and travel, as you seem to imply. My belief is that it it was and is designed mainly in the interests of public health.

Your argument based upon the distance from Quebec to the Western States must have been intended for the "uninformed public," because, in common with all sanitarians, you must know that the two weeks period of incubation of small pox is long enough for an emigrant exposed in Hamburg to cross the ocean and go a thousand miles into this country in time to spread the disease at his destination.

In your circular is a statement by a railway manager that "An inspection against this at Windsor would be very like a Canadian inspection at Detroit against a disease prevailing on the Gulf of Mexico. This seems to me either to ignore the fact of the tide of immigration into Michigan and the North-west through Port Huron and Detroit, or to be based upon ignorance of the fact that there is not a great rush of emigrants from the Gulf of Mexico into Ontario by way of Detroit.

Small-pox is not the only disease (nor the one which should be most feared in Michigan) that is brought into Michigan and the North-western States by immigrants. We need an inspection of immigrants at Port Huron and at Detroit, for reasons which I have not had time to explain to you, and which, if you will exercise your usual good sense, you will appreciate when they shall be placed before you.

Very respectfully,

HENRY B. BAKER,
Secretary.

REPORT OF SECRETARY *RE* SEWERAGE AT ST. MARY'S.

OFFICE OF THE PROVINCIAL BOARD OF HEALTH.
TORONTO, August 13th, 1891.

To the Chairman and Members of the Local Board of Health of St. Mary's :

GENTLEMEN,—Having at the solicitation of petitioners visited the town of St. Mary's and investigated with your board and members of the Council, the cause of the complaint, I have the honor to report the following opinion as to the most practicable method of remedying the evil.

To comprehend the situation properly, the following points must be considered :

1. That the stone drain, laid many years ago, without a perfect grade, was intended only for draining cellars and for carrying storm-water, and hence was not constructed in such a way as to prevent accumulations of solid materials at some points, or soakage from the drain into the surrounding soil at others.

2. That while the level of the drain at its outfall may at the time of construction have discharged the sewage into the river, yet the annual lowering of the summer level of the river makes the accumulation of the sewage at the outfall a serious nuisance.

3. Hence there are two sources of nuisance, each requiring to be abated.

With regard to the first it is manifest that it is necessary :

1st. If the present sewer to allowed to exist, it must be cleansed, and kept so. This means the cutting off of polluting sources, such as drainage from cesspools privies, water-closets, etc., in other words, that without a regular water supply for proper flushing, after a new good grade has been established, it should be used only for drainage of cellars and storm-water.

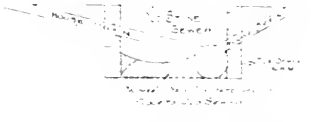
2nd. The nuisance caused at the sewage outfall would in this way be permanently remedied, if existing deposits were removed.

3rd. As, however, it does not seem a wise, or perhaps practicable procedure to remove the nuisance in the manner indicated, since slop-waters at least must always require to be dealt with, it seems desirable that the question should be dealt with along the line of more modern methods ; *i.e.*, utilising the sewer to its fullest capacity, but in a sanitary manner. This may be done by—

a When the weather is cooler, opening up existing sewer, cleansing it, laying it at a true grade from end to end, and cutting off from it all house drains. Using it only as a storm-water sewer delivering at the river's edge.

b. Laying in the bottom of the old sewer a 6 in. to 8 in. glazed tile set in cement, the bottom of the old drain being also rounded and smoothed with cement.

The following will illustrate :



This tile sewer must be supplied at proper distances with manholes for inspection, and an automatic tank for flushing it at the head of the sewer. Opposite each lot tiles connecting with main by a Y should be laid, thus providing for house connections. These may then be connected with by householders under the supervision of the town engineer.

c. This sewer might be in the meantime extended into the current of the river as an iron-pipe.

Should the use of public water be introduced into St. Mary's and a general sewerage system be established, provision would have to be made for disposing of the sewage in some way, other than into the river.

d. This small sewer is to be a carrier of sewage only, and every householder using it would be assessed a proportion of the cost of construction, as a local improvement.

A number of other serious unsanitary conditions were observed, to which I drew the attention of the Board.

The most notable is the use of water in the lower part of the town from surface wells, some of which are undoubtedly polluted and dangerous. These must be closed by the Local Board wherever polluted.

The next is the existence of privy-pits in populous parts of the town. By the adoption of cheaply constructed dry-earth closets, this evil could in large measure be removed,

Trusting to learn at an early date that action has been taken in this matter.

I have the honor to be,

Your obedient servant,

PETER H. BRYCE,
Secretary.

COMMUNICATIONS *RE* TRANSPORTATION OF THE DEAD, ISSUE OF BURIAL PERMITS, AND THE UNDERTAKERS' BILL.

To WM. EDGAR,
General Passenger Agent, G. T. R.,
Montreal.

TORONTO, January 13th, 1891.

DEAR SIR,—I have the honor to report to you the result of the discussion by the Committee on Epidemics *re* the proposed rules for the transportation of dead bodies.

The following is the Committee's resolution with regard to the matter.

Moved by Dr. Covernton, seconded by Dr. Cassidy :

"That the Committee having considered the regulations submitted to the Board by the Grand Trunk Railway *re* "Regulations for the Transportation of Dead Bodies," would reiterate the views expressed by the Board in resolutions adopted at the quarterly meeting in May, 1889, and further, that the Committee forward to the railway authorities the Health Acts and regulations of the Board bearing upon this matter, with the request that the railways adopt rules in accord with the Board's views as therein expressed." Carried.

RESOLUTIONS.

1. That the rules for the transportation of dead bodies submitted by the National Association of General Baggage Agents are in accord with the views of Sanitarians, and are calculated to prevent the spread of contagious diseases.

2. That in the opinion of this Board it is desirable that the practice of transporting the bodies of persons dead from dangerous communicable diseases be discontinued, owing to the impossibility of at all times preventing persons who may have been infected, owing to their contact with the corpse, sick-room, or persons who have been in contact with the sick from coming in contact with other susceptible persons.

3. So long, however, as dead bodies are transmitted by rail this Board would recommend, that the following diseases in addition to those included in Rule I of regulations submitted be absolutely forbidden rail transport, viz., diphtheria, anthrax, scarlet fever, measles, and puerperal fever.

4. In those cases where corpses are transmitted it is the opinion of this Board, that inasmuch as undertakers are not examined or licensed in this Province at present, it is imperative that the preparation of the body and the other details of the funeral, be supervised by the Medical Health Officer, whose affidavit must be obtained to the effect that every precaution under the Public Health Act has been taken.

5. It is further, in the opinion of this Board, imperative that the Medical Health Officer of the municipality to which the body has been consigned be notified of the hour of its arrival within his jurisdiction in order that he may supervise its burial.

A similar communication has been addressed to the Canadian Pacific Railway Company, and the Board trusts that the railway companies will aid it in preventing in every practical way the dissemination of infectious diseases.

I have the honor to be
Your obedient servant,

PETER H. BRYCE,
Secretary.

P. S.—To illustrate the point that transportation of corpses ought to be discouraged, I refer to a fact brought to my attention this morning. It is as follows :

According to the newspaper notice of death, J. McC. died at Thorold of typhoid fever on 9th of January, 1891. The Grand Trunk permit for transit states that J. McC. died at Thorold on 8th of January, 1891, of bronchitis.

The certificate given by the attending physician is to the effect that J. McC. died on the 8th of January, of pneumonia. The certificate is dated Thorold. The body was transported to Toronto *via* the Grand Trunk Railway and buried here. It was forwarded in an ordinary wooden case, no precautions whatever of a disinfectant character having been exercised before forwarding body. Comment is needless.

PROVINCIAL BOARD OF HEALTH,
TORONTO, June 17th, 1891.

E. HOPKINS, Esq.,
672 Yonge street,
Secretary Toronto Undertakers' Association.

DEAR SIR.—In reply to your request in a conversation had recently with you, that I make some suggestions with regard to the rules which should guide undertakers in dealing with the funeral of persons dead of contagious diseases, I would say, that the Provincial Board has at various times made regulations for the guidance of Local Boards under section 9 of the Public Health Act, in addition to the laws laid down in various clauses of said Act.

For instance the Vaccination Act and Small-pox regulations herewith forwarded, serve as a guide in such cases ; while at page 54 of the report of 1886, which I send you, you will find regulations drawn up with reference to diphtheria.

I think it would be well for your Association to direct the City Health Officer's attention to the difficulties you have as undertakers in dealing with funerals in cases of contagious diseases.

These regulations quoted are legal guides under section 9 of the Act, and if section 7 of said diphtheria regulations were carried out your difficulties would disappear. I think it most desirable that the City Health Officer should issue printed rules to all undertakers in the city, in which the sections of the Act contained in the previous clauses of these above mentioned regulations would be printed, while he could draw special attention to clause 7. In such instances where he thought the undertaker a man who would carry out directions in good faith, the Medical Health Officer could very well delegate the duties laid upon him with regard to superintending the preparation of the corpse, and the disinfection of rooms to the undertaker ; in other cases his inspectors would carry out the Regulations.

Regarding the transportation of bodies, the railways have now a set of rules with regard to the preparation of bodies prior to transportation. The method for properly carrying out this work, would be for the undertaker to obtain the attending physician's certificate as to cause of death and present it to a Medical Health Officer, who would exercise his judgment as to the propriety of issuing a transportation certificate. In any case where he had reason to doubt the accuracy of a death certificate, he would naturally defer issuing the transportation certificate until he was satisfied as to the non-contagious nature of the disease.

You are aware of this Board's views with regard to transportation. I send you a copy of the resolutions adopted by it on the subject.

I shall be glad to aid your Association in getting this matter into shape in any way that may seem agreeable to you, and shall endeavor, if you wish it, to get the railways to alter their at present unsatisfactory certificates.

Trusting to hear from you at your convenience,

I am, yours truly,

PETER H. BRYCE,
Secretary.

NOTES—RE UNDERTAKERS' BILL.

The principle involved implies the establishment of a school, where :

1. Undertakers can be educated in the Arts of their work.
2. Where they will learn the causes wherein lie danger from dead bodies.
3. They will learn to avoid them.
4. They will study the phenomena of contagious diseases.
5. The most approved methods of dealing with bodies dead from them.
6. Of disinfecting rooms and houses where they are.
7. Of disinfecting hearses and other vehicles, and of conducting transports properly.
8. It places them under the regulations of the Provincial Board of Health regarding these matters, the condition of registration being dependent upon the adhesion to such regulations.
9. The public safety is thus assumed in regard to funerals in cases where the Local Health authorities might be derelict.
10. No person is prevented from performing any burial rites as heretofore : only that those who are making a business of undertaking may be recognised by the public, as being those who presumably have a technical knowledge of the Art.
11. It is in a peculiar sense, a department of public sanitation.

REPORT *RE* PROPOSED SEWERAGE SYSTEM FOR TORONTO JUNCTION.

TORONTO, May 14th, 1891.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—Your Committee on Sewerage and Water Supply has the honor to submit its report on the plans and specifications herewith attached re the proposed scheme of separate sewerage for West Toronto Junction.

Before discussing the details of the system it may be stated that the position of Toronto Junction situated as it is to the west and north-west of the city of Toronto, and bordered roughly on the west by the Humber, at once indicates that any system of sewerage there established must be considered as related to the conditions appertaining to the sewerage systems and water supplies of neighboring municipalities, but notably to those of Toronto.

From the plans it will be seen that at present West Toronto Junction obtains its water supply from Humber Bay at a point 700 feet from the shore, and 2,500 feet from the mouth of the Humber. This Board, it will be remembered, pointed out at the time the plans for these waterworks were submitted to it, that while the Board could not reasonably object to the source of supply under the then existing conditions, the town must expect when in the near future it would naturally inaugurate a sewerage system, that the difficulty of disposing of its sewage would become apparent. The scheme proposed makes this point abundantly evident.

It will be seen from Mr. Kuichling's report that he has fully recognised this fact, and that he has at some length endeavord to produce conclusive evidence that danger to the Toronto water supply from this source need not be apprehended. He, however, somewhat illogically makes the recommendation that the town of West Toronto Junction remove the location of its intake water-pipe to a point some three miles further west. Your Committee is glad to know that Mr. Kuichling believes that there is at least a limit to the proximity which may exist between a water intake and a sewage outfall, compatible with perfect safety to the public.

With these preliminary remarks the following consideration of details are submitted :

1. The history of the Toronto waterworks is of interest, as it illustrates what has taken place in all the larger cities which have grown up along the great lakes. The intake pipe was first placed in the bay at a short distance from the shore. Later the pollution of the bay created the necessity of carrying the pipe across the bay and establishing a filtering and settling basin near the light-house on the island. This at length became polluted, and being injured by storms caused the removal of the intake pipe to its present position near the bell-buoy, where it has till recently been considered perfectly safe from all future danger of pollution.

During the past several years some doubts on this point have been expressed and the series of analyses recently published by Dr. Ellis, would seem to show that at any rate as regards organic pollution, some cause has been at work which has degraded the city water from the high rank it possessed only a few years ago.

That this is due to sewage reaching as far as the intake pipe in quantities sufficient to be measured by chemical analysis, we do not require to admit ; but that that is possible, is we think, beyond question when the relative position of the intake-pipe to the eastern and western gaps

is considered. From Prof. R. R. Wright's analyses made so long age as 1886, in which it was shown that while the number of microbes in the water at the bell-buoy was .0 at the pumping well the number in the sample for the western gap was 4,500 per c. c.

Remembering further, that the sewage of to-day is probably 50 per cent. greater than it was in 1886, it is only reasonable to conclude, that as the ice of the bay with a westerly wind is frequently swept out within a single night, so the bay water and its sewage is with westerly winds moved rapidly out of the eastern gap. It needs only a change of wind to the east, such as we know frequently takes place, to turn this surface current westerly along the outer side of the island, when within an hour or two it will have reached the vicinity of the intake-pipe. It must further be remembered that with so great a volume of sewage the constant element in this pollution becomes increased, *i. e.*, the organic deposits along the shores of the island, the marsh, etc., of heavier matters become a permanent factor in this question of pollution. Hence the tendency is toward a permanent deterioration of the quality of the city water. Many analyses of the great lake waters by Dr. Ellis have shown a permanently high constant in their vegetable organic compounds as compared with English standards, going to show that the complete decomposition of this matter is positively never accomplished, owing to the continued pollution by the vegetable materials carried down streams. That sewage matters may add to this might have been inferred, and the history of the city water seems to prove this, as also does the history of the Parkdale water supply.

As a separate municipality Parkdale established a public water supply and a sewerage system, the intake-pipe of the water supply being only a few hundred feet from the shore (685 now 1500 feet), while the main sewer discharged at a point some 3,000 feet from it. Progressive pollution had become with the recent rapid growth of Parkdale so marked that typhoid became endemic there, and remained so till the water-works Committee recently considered the advisability of stopping pumping from this polluted source. Whether Parkdale and Toronto bay sewage polluted Toronto Junction water supply has not been ascertained, but it is certain that the latter town has suffered during the past year to some extent from the prevalence of typhoid.

Remembering the shallow beach extending out into Humber bay for thousands of feet, as well as the state of the bar and the long exposed shore, the character of the water there will tend always to be inferior to that at the point of the Toronto intake under normal conditions. This is also increased by the deposits from the Humber, while with the increasing growth of the city westward, with the growth of the new town of Mimico, and of lake-side residences, there will be created another source of pollution tending to a constant degeneration of the high standard of Lake Ontario water in the vicinity of Toronto.

WATER AT BELL-BUOY JULY, 1886

Appearance : clear, pale greenish yellow

Chlorine	3.0
Free ammonia	none
Albuminoid ammonia	0.02
Oxygen absorbed in 15 min	0.15
Oxygen absorbed in 4 hrs	0.58
Total solids	124.00

WATER AT BELL-BUOY MARCH 6TH, 1891.

In parts per gallon.

Appearance : Turbid

Chlorine	4.00
Free ammonia	0.08
Albuminoid ammonia	0.16
Oxygen absorbed in 15 min	0.88
Oxygen absorbed in 4 hrs	1.50
Total solids	162.50
Organic impurity according to Muter's scale	0.67

2. So far the history of the water front of seven miles has been considered. Your committee however, in considering the question submitted to it, must have regard especially to the future. Toronto and its suburbs has much more than doubled its population in ten years. Like all the great lake-side cities, it may be expected to expand very greatly in the next ten or twenty years. Assuming that this is true and that a proposed trunk sewer for Toronto is built with sewage outfalls at points similar to those indicated by various engineers reporting recently on it,

the history of water pollution in the past, will, your committee believes, be exemplified in an increasing ratio in the future. The eastern sewage outfall cannot without enormous expense be carried, it is believed so far east as to seriously alter those conditions which, as the history just summarized shows, have tended to rapidly deteriorate the purity of the Toronto water supply. In fact there is some reason to fear that outfalls located three or six miles east of the water intake would not prevent the rapid movement of the sewage before it is decomposed directly toward the intake-pipe under favoring winds. Whatever æsthetic evils are produced by sewage being poured into the bay it is very probable that its detention in the bay serves in quiet weather to give time for a considerable degree of decomposition, and therefore purification, before it passes out to the line where it can be drifted toward the water-pipe ; although this latter danger is constantly increasing.

But the Toronto trunk sewer scheme further contemplates a western outfall very near the present Toronto Junction water intake. With the history of the pollution of Parkdale water, this proposition seems to have been made without due regard for the rights of Toronto Junction to obtain water from the source available for the several lake-side municipalities. Manifestly it would be as improper, and much more unreasonable, since Toronto has a possible easterly sewage outfall, that another outfall for the city should be located in Humber bay, as that Toronto Junction should be allowed to construct a new sewerage system with its outfall into Humber bay.

(Reference was here made to the several plans contained in the two reports submitted.)

3. Dealing briefly then with the reports submitted and the plan recommended by the consulting engineers to Toronto Junction, your committee would say :

(*a*) That it cannot in any way agree to the proposition to pour the sewage into Humber bay so long as Toronto Junction takes its water from the present source.

(*b*) That while the pollution of the bay by the present population of the Junction would not in all probability affect seriously the purity of the Toronto water supply, yet as the system proposed is for a city of 30,000 to 40,000 inhabitants, it becomes the duty of this Board under section 30 of the Public Health Act to view the proposed scheme from this standpoint.

(*c*) The scheme proposed contemplates the removal of the town's water intake-pipe to near Mimico, and suggests that Mimico take its water supply from West Toronto Junction. Your committee's experience is, however, that most municipalities prefer controlling their own water supplies.

But whether this were done or not, it does not remove the future danger to this source of supply, from the fact that Mimico will be soon forced as the Junction is now, to adopt a sewerage system, and could with the same reasoning with which Mr. Kuichling in his report adopts with regard to Toronto water supply, say, "We shall remove our water intake-pipe to some point further west, thereby preventing its pollution, and Toronto Junction must look out for itself in the matter of its water supply."

Any argument based on the supposition that Mimico will not grow to such an extent as to create such a danger could be sufficiently refuted by pointing to the history of the Junction itself.

(*d*) Since these several points indicate the conclusion that it is unwise in the public interest for the scheme C (of Mr. Chipman's report) favored by the engineers to be adopted by the town, viz., that of pouring sewage into Humber bay, it may fairly be demanded of your committee by the town council, which of the other schemes proposed meets with its approval. In reply to such a demand your committee would say that scheme A proposed in Mr. Chapman's report, is that which would be most free from present objections, since it would add a relatively small amount of pollution to Toronto bay at the old fort ; and further, it would not create a new problem in addition to that of the Toronto question.

(*e*) It would prevent the construction of an expensive main sewer to Humber bay which might prove useless in case the Junction at some future time decided to join in with the Toronto sewer scheme and would further remove the necessity for the three mile water-pipe to Mimico point, although an extension into deeper water of the present pipe is certainly desirable.

(*f*) Should it be objected that scheme A will necessitate the establishment of three pumping stations, your committee would say in reply that as the population of the area, the sewage of which would have to be pumped does not now exceed 1,500, the amount of sewage pumped, with this population increased to 5,000, would not be more than 30,000 gallons per diem, which amount and much more can be pumped by one or two windmills at the sewage outfall on Bloor street with tankage enough for a day's supply in case of absence of wind. Should the scheme of pumping to Dundas street, at the end of this period be found to be favorable as a permanent one, steam power could then be made to replace the latter.

(*g*) But should a more permanent method of disposal of the sewage of the town be considered necessary at once independently of the city of Toronto, it appears to your committee that the purchase of suitable land would be a practical procedure ; since it would be at once available as a sewage farm for present needs, the sewage being carried there by gravity, or at some later stage would form an admirable location for works where chemical or electrolytic precipitation and subsequent filtration of the effluent might be carried on.

(*b*) Finally, it is desirable that the construction of any expensive trunk sewer to the Humber be delayed owing to the scheme at present being considered by Toronto for obtaining a public water supply by gravity.

This if successful will greatly simplify the whole question of sewage disposal for the several lake-side municipalities.

All of which is respectfully submitted.

P. H. Bryce.
J. D. Macdonald.
H. E. Vaux.

REPORT OF SECRETARY *RE* DISPOSAL OF SEWAGE AT AGRICULTURAL COLLEGE.

Toronto, June 5th, 1891.

Hon. John Dryden,
Minister of Agriculture.

Dear Sir,—In accordance with the instructions contained in your letter of the 2nd inst., I proceeded to the Agricultural College on the 3rd and investigated the arrangements for the disposal of sewage.

The amount of sewage daily discharged from the college averages 3,000 gallons. It receives on its way to the tank house about 12 lb. of ferozone precipitant daily, and is allowed to settle in the tanks for 24 hours. Each evening the clear upper fluids are carried off to the filtering ground and the precipitated portion or sludge is swept from the bottom of the tanks into a conduit, and thence discharged into a box containing about 12 cubic feet on a sled.

The filtering ground is a flat bed of a gravelly clay loam, 100 feet by 75 in area, and is divided into two parts, each of which receives on alternate days the sewage of 24 hours.

Beneath the filter beds are 7 field tile drains at a depth of about 2½ feet increasing to 3. The outfall of these is about 2 feet above the present level of water in the creek.

The sewage is delivered on the field from a horizontal box 6 by 8 inches with six gates to distribute the sewage evenly on the field.

At the rate of 3,000 gallons daily, each of the 75 by 50 feet beds if perfectly level would be covered by a depth of sewage water nearly 2 inches deep which has 48 hours to disappear, either by evaporation or into the ground, whence it filters to the tile drains and passes into the creek.

Such is the basis upon which the filter ground is supposed to dispose of the sewage.

On inspection I found the following :—

1. That the precipitant arrangements and tank-house are in good order. That the horizontal box which distributes the sewage is not washed down, and hence sewage clings to it and decomposing produces slight odors.

2. That the beds are not level, and that not 50 per cent. of surface of either bed is covered daily. From this results that the sewage accumulates several inches deep at the low points, and hence not descending rapidly enough into the ground has time to decompose on the surface, and therefore produces some odor.

3. That the surface of the beds have never been cultivated or loosened up in any way, and hence are baked hard and do not absorb rapidly, and do not admit air into the soil readily.

4. That only one of the subsoil tiles was delivering any water into the creek and this did not amount to more than 55 or 60 gallons of clear water in 24 hours.

5. That there is absolutely no sewage pollution of the creek, and that the complaints of persons resident on the creek below are absolutely without cause.

6. That the sewage sludge is at present deposited in the barnyard instead of being daily deposited on some plowed field.

Recommendations.

(*a*) In order to give the filter a chance to do its work, which I think is at present of sufficient area if carefully attended to, I would suggest that the two beds be divided into four beds by a little embankment, and that all be brought to a perfect level or so nearly so that the sewage will be evenly distributed on each. By this arrangement each bed would have four days wherein to dispose of its sewage and to have the surface kept loose and ready to absorb the next charge of sewage.

(*b*) To remedy to some extent the necessity for so frequent loosening of the surface and to promote rapid filtration, I would recommend that for comparison, two of the beds be covered respectively with 4 and 6 inches of fine gravel. The sewage will at once sink below the surface of the fine gravel and surface decomposition will be prevented.

(*c*) The distribution of the sewage can be made more perfect over the bed by laying field tiles from the main carrier under the gravel across the filter beds.

(*d*) The box drain serving as an open sewage carrier should be either washed down frequently or, better, should be replaced by a few glazed tiles with offsets to the distributors on the beds.

(*e*) The sludge which is removed daily by sled to the barnyard, may with advantage be drawn directly to a fallow ground, distributed along a furrow and so plowed in.

Trusting that these several details may at once be given effect as the hot weather is coming on, and even the semblance of a nuisance will be detrimental to the good opinion, which I trust will grow regarding sewage farms.

I have the honor to be,
Your obedient servant,

PETER H. BRYCE,
Secretary.

THE PRESENT POSITION OF THE MILK-SUPPLY PROBLEM FROM THE PUBLIC HEALTH STANDPOINT, AND SOME PRACTICAL METHODS FOR SECURING SAFE PUBLIC SUPPLIES*

BY THE SECRETARY.

GENTLEMEN,—During the interval since our last meeting I have been requested to introduce for discussion a paper on "Public Milk-Supplies." In order to properly lay before the association a subject so broad in its practical bearings and so replete with important and interesting details, a paper greatly extending the limits of time allowed for any single subject would be necessary. I shall, therefore, deal briefly with the first part of my subject, in order that I may discuss at greater length those numerous details with which every executive officer of health ought to be familiar.

1. *The Use of Milk as a Food.*—Perhaps nothing will better indicate the importance of guarding this source of food-supply, than to recall the enormous consumption of what from earliest times has been more or less universally used as food by all nations. It is the natural food of all young mammals, whether human mammal or beast-mammal. "Milk, from the earliest times," says Dr. Wynter Blythe, "even when its composition was most imperfectly known, has been considered the type of foods." Statistics may be given to illustrate the extent of the use of milk and milk products.

In the province of Ontario, 737 cheese factories were reported in operation in 1888. Calculating from returns made by 557 factories, the following table is given:

No. of factory.	Milk used, lb.	Cheese made, lb.	Value.
737	686,369,013	65,299,751	$6,031,470

In 404 factories, with complete returns, the amount of milk used was 402,599,463 pounds from 150,618 cows. The average number of days in which the factories worked was 155, and the average amount of milk per cow was 2,673 pounds. The total number of patrons was 24,644, or about one eightieth part of the population of the province.

Assuming that two-thirds of the population of Ontario is agricultural, we may say that but one-tenth of the total production of milk in the province for 155 days, or less than half a year, was utilized for cheese-making. Now, if we multiplied the quantity of milk by ten, and added a half for the number of months remaining, we should have the enormous total of over 10,000,000,000 pounds of milk produced during a single year, or fifteen pounds *per capita per diem*.

Remembering that the great bulk of the cheese-products are exported, and that butter and milk are the chief foods used in Ontario, it is quite probable that this statistic is not greatly overestimated.

The report of the Ontario Bureau of Industries for 1890, states that there were in the province that year only 175,000 farmers, having 777,838 milch cows. We have, however, to add to these the many thousands of cows which are kept for purely milk-supply purposes by people in the cities, towns and villages.

---

* Read at the nineteenth annual meeting of the American Public Health Association.

From statistics, I find that in 1890 the number of cows in the United States is given as 15,952,883, each yielding, on an average, 450 gallons per year, or a total of 6,750,000,000 gallons; and that only five per cent. of this total is used as butter and cheese, the balance 95 per cent. being used as milk in its natural state. If all were sold at 12 cents per gallon, it would amount to $810,000,000. In New York State there are 1,552,373 cows.

If, then, this single food-product, having a value so enormous and in itself a perfect food, is to be continued as a universal food, it is apparent that this association cannot engage itself with any single subject with such potentialities for good as this food of the nation, or such possibilities for evil, if we admit that it may possess, or become the medium for disseminating ills, perchance as numerous as those from Pandora's box.

When we think that in the United States there is one milch cow to every four inhabitants and that one hundred gallons *per capita* is the amount of milk produced annually, we have some idea, not only of the magnitude of interests involved and of the use of milk and milk-products, but also of the enormous task involved in maintaining these 15,000,000 milch cows in good health, and in protecting the milk, when produced, against pollution. There are in the United States 42,000 (graduated in ten years) physicians, whose duty I assume to be to maintain the people in good health or to heal those who are sick. What number of veterinary physicians is there, I ask, who are devoting their attention to the problem of maintaining these milk-producing animals in health, or in preventing evil results from attending the use of milk, unwholesome at the time of taking from the cow, or in its often strange and eventful history up to the time it reaches the consumer?

When we refer to the infectious diseases alone, which affect the bovine species, we see that they are of a number and character such as to urgently demand close attention and systematic supervision. Thus, they are subject to cancer, tuberculosis (in its several forms of scrofula, phthisis pulmonalis, tabes, tubercular meningitis, glandular tumours, etc.), actinomycosis, anthrax, symptomatic charbon (or black quarter), milk sickness or "trembles," rinderpest or cattle plague, Texas cattle fever, vaccinia, scarlatina, parturient septicaemia, pyaemia, septicaemia, septic mammitis, glanders, diphtheria and croup, rabies, trichina, taenia, echinococcus, pleuro-pneumonia, eczema contagiosa (foot and mouth disease), etc.

In this extended list I have selected diseases, every one of which has been probably known to this continent, and some of them, unfortunately, too well known. As a rule, it is not those *malodies fulminantes*, slaying whole herds in a few weeks, that cause us alarm in the matter of milk-supply, but rather those less acute diseases, which, owing partly to ignorance partly to carelessness, and not infrequently to culpable cupidity, while not depriving a cow wholly of her milk-producing ability, are disseminated in milk-supplies to an extent proportionate to the numerous opportunities offered and to the vulnerability of the person taking the milk.

The past has legends enough of animal disease spreading to man, which, with greater care, to-day are not so commonly seen; but we are not wanting in illustrative cases. Thus, during the past summer anthrax appeared in an Ontario county in cattle feeding on bottom lands along a creek below a tannery where South American hides are used. Several animals had died suddenly, from what was supposed to be chemical poisoning due to the polluted water from the tannery. The matter being brought to my notice, I investigated, and suspected anthrax, which was verified in my laboratory. In the meantime another cow sickened. She was milked in the evening, and some one luckily suggested the advisability of not using the milk. It was given to some young pigs. Two died within four days thereafter; the majority recovering, as frequently takes place in pigs. Thus in England and Wales, out of 210 pigs attacked with anthrax in 1890, 117, or over 55 per cent., recovered.

In this outbreak just referred to, a man who, after being warned regarding the nature of the disease, skinned another cow which had died, intending to surreptitiously dispose of the skin, became inoculated, and lay for sometime in a dangerous state.

Of those diseases, however, which, owing to their less acute character, we have most difficulty both in detecting and eradicating, actinomycosis is taking a place prominent in the degree that its nature and prevalence are being recognised. On a single day four head of cattle infected with this disease were received into the Toronto cattle market, and the disease has by statute this year been placed amongst those scheduled as unfit for human food. Some of the dangers of its spreading and of the difficulties in dealing with it, are admirably set forth in the annual report for 1890 of the health officer for Chicago.

But, as compared with other diseases, the one which must be recognised on every hand as being, *par excellence*, that to which sanitarians, medical health officers, and physicians must devote their special attention, is tuberculosis. That tuberculosis causes one-seventh of all the deaths of the human race is stated by reliable statisticians; that it prevails in almost every land is well known; that it is disseminated everywhere on the American continent is equally well established; and that it has greatly increased in prevalence is unfortunately too true. That until recent years it prevailed but little amongst American cattle is probable; but that it has increased, as animals improved by in-and-in breeding have been imported for stock purposes,

is well known ; and that it has been rapidly developed by the growth of dairying for the supply of milk to the enormously increased populations of our American cities has now become a well authenticated fact. These facts are sufficient to cause us to pay some special attention to the more prominent points of interest associated with the disease in milch cows.

In 1890, of all the cattle slaughtered in Berlin, 4.5 per cent. were tuberculous ; while in Upper Silesia, 9.5 per cent. of all slaughtered in a single abattoir were tuberculous. Bitter affirms that, while statistics are not extant, there are, he has reason to believe, at least 10 per cent. of dairy cattle tuberculous in cities and their environs. No precise statistics have anywhere been tabulated regarding the prevalence of tuberculosis in dairy cattle in British cities, but that it is much too prevalent may be gathered from evidence such as that published by the Local Government board's report regarding tuberculous meat in Glasgow. The reason for the absence of such reports is that tuberculosis is not included in the list of contagious diseases in the (Animals) Contagious Diseases Acts of England and Wales, and animals affected with it can only be got at by the by-laws regarding unwholesome meat and milk. In the report of the Veterinary Department of the English Board of Agriculture for 1890, the following occurs in a paragraph referring to tuberculosis being placed on the list of contagious diseases in animals : "Recently the subject has been brought to the notice of stock owners and dealers in a very pronounced way, in consequence of the very frequent seizure by sanitary authorities of carcasses of animals, which, after being sold in open market as healthy cattle in fine condition, had been found affected on post-mortem examination, and had been confiscated without any compensation to the purchaser, who had acted throughout in good faith, as also had the seller and all other persons concerned in the transaction."

"That the sufferer should appeal to the government for compensation was natural, since they asserted that, (1 The fact that many animals apparently healthy show after slaughter tuberculous disease, and, 2) That there is no ground for seizure and destruction of meat which was perfectly healthy to the eye of the meat inspectors, merely because some of the internal organs were affected with tubercles."

A royal commission has been the outcome of these representations, which is inquiring into the degree of infectiveness of the meat of tuberculous animals.

The same report gives the results of some experiments carried on during several past years to determine this important point. The following facts are granted, viz. :

(a) Lower animals may be infected with tubercle derived from the human subject.

(b) Bovine tuberculosis is communicable to other animals by inoculation, and by feeding with tuberculous material.

(c) A peculiar character of bovine tubercle, "grapy' form (perlsucht), does not appear in any animals as the result of experiments.

(d) The inference that man is susceptible to infection from the lower animals remains, and must always remain, based on analogy, direct experimental proof being unattainable.

The experiments undertaken were with the intention of determining whether meat of tuberculous origin, yet not containing any obvious tubercles or any tubercle bacilli detectable in microscopic examination, is capable of producing tubercle.

The experiments were carried on in three sets. In the first series, where seven rabbits and six guinea-pigs were fed upon muscle from undoubted cases of tuberculosis in cattle, post-mortem examinations, all within a few weeks (three or four months), showed that ten of these animals or 77 per cent., were affected with tuberculosis ; while five animals fed on milk from cases of undoubted tuberculosis, or on material other than milk from doubtful cases, were all, without exception, found to be in a normal and healthy condition.

In the second series, nine guinea-pigs were fed with tuberculous muscle mixed with oats and bran for five days. The feeding took place in the middle of December, 1890. On January 2nd, one animal was taken from each of the three cages and examined post-mortem, and not a trace of tubercle was found in any. From the 3rd January to the 10th, the remaining six were fed with pressed meat juice added to bran and oats ; thereafter on ordinary diet. On January 14th, one died, and was found to have tubercular disease. On the 20th of January, another died with pronounced disease of intestines. On January 22nd, a third was found dead with extensive disease of lungs, liver and spleen. All of the remaining animals of the series showed pronounced tubercular disease, especially of organs of the alimentary canal. The two central animals, fed on bran and oats only, were killed early in February, and were found perfectly healthy.

Here the percentage of well marked cases of tuberculosis in animals fed on muscle or juice was 75 per cent.

A third series of experiments, carried on in Edinburgh, in the laboratory of Professor McFadyean, were negative in their results, and comparable with similiar experiments by Nocard and Bollinger. Professor Brown remarks, regarding these three sets of experiments : "On the other hand, the first and second series of experiments leave us no room for doubt that meat taken from tuberculous cattle, the tubercle being trimmed off without any special precautions,

exactly as is done by the butcher, is capable of causing the disease in animals which partake of it in a raw state. The further question of the degree of cooking which is necessary to destroy the infective character of the meat, has yet to be determined by experiment."

I have made this reference to diseased meat, since it is intimately related in its bearings to the question of the power of milk to transmit the germs of disease, as tuberculosis.

From Koch's first experiments, and from those of numerous investigators since, it seems to have been proven beyond doubt that tubercular nodules in the udder are a source by which the bacilli of tuberculosis are directly transmitted with the milk. This point seems to be settled as definitely, as that flesh with tuberculous matter in it is infectious. That this danger is a serious one, is seen from German statistics already quoted, and from other data where, as in Edinburgh, of 660 cows, 37 had tubercular mammitis. How far milk from tuberculous cows with no tuberculous nodules of the udder is tuberculous (as far as clinical examination goes), is a question of even greater importance than that of whether or not meat with no tubercles is capable of transmitting the disease.

Some recent experiments in Denmark seem to show that the danger, at this stage, of transmitting tuberculosis is not very great. The question, however, of at what stage the milk of a cow affected with progressive tuberculosis becomes dangerous, or infected with bacilli, is of such paramount importance that it is one which we may very properly consider. The following are the most recent conclusions on the subject, based upon actual experiments:

The report of the recent Paris congress on tuberculosis does not seem to have added any special light on the subject; but the experiments carried on by Dr. Ernst, of Harvard University, seem to have been so extended and thorough as to leave no doubt as to the dangers from this source. The report states that veterinarians give instances of the infection of calves from tuberculous mothers; and that this is true is undoubtedly shown from M. Vignal's experiments, as related at the Paris congress, from which the conclusion is drawn that it is transmitted from mother to fœtus during pregnancy only in extremely rare cases.

In Dr. Stone's experiments, conducted under Dr. Ernst, 126 separate microscopic examinations of milk from affected cows were made, and in sixteen instances the tubercle bacillus was found, or in 13 per cent. of cases. The report further says:

"By inoculation of the same milk in rabbits and guinea-pigs in seventy-four inoculations we produced six cases of tuberculosis, the inoculation being from only one to three drops of milk. This means in 8 per cent of rabbits and in over 13 per cent. of guinea-pigs.

"From feeding experiments with twelve pigs, nearly 50 per cent. became tuberculous, and of twenty-three calves, eight, or 23 per cent, became tuberculous."

That the milk in public supplies may be dangerous has been shown by tubercle bacilli being discovered in mixed milk in Boston, and also from Foster's experiments, who found that tubercle bacilli may exist in milk for at least ten days.

How much value can be placed upon these experiments, viewed from the practical standpoint cannot yet be determined; but it is fair to say that if an inoculation of milk is made with many forms of bacteria, they seem to find milk to be a very good culture medium. That all, however, is not known on this subject must be confessed, and that the fluid tissues of the body and their secretions exert in their normal condition certain protective influences against the invasion of disease has been established beyond doubt.

Many are doubtless familiar with the results of the remarkable experiments which have been carried on during the last three years, growing out of Metchnikoff's phagocyte theory. From these it becomes evident that there is another element in the immunity of certain animals against certain diseases, while the same animals will succumb to other diseases. That, for instance, blood serum exerts a certain bactericidal influence is known by foreign researches, as also by those of Professor Prudden. At this point comes the difficulty of deciding what constituent of blood serum possesses the power; and hence it has come about that certain nitrogen compounds have been extracted from the serum, which, when inoculated into animals, produce immunity in certain directions. These compounds have been called tox-albumins, or defensive proteids; and the theory of their action in creating immunity has been stated by Hankin as follows:

"Immunity, whether natural or acquired, is due to the presence of substances which are formed by the tissues of the animals rather than by those of the microbe, and which have the power of destroying either the microbe against which immunity is possessed, or the products on which their pathogenic action depends."

The important influence of these recent studies on our views with regard to the transmissibility of bacterial diseases cannot be overlooked, and doubtless are of much value; but there are two conditions, which, in connection with our present subject, must necessarily exert a potent influence on the normal quality of cows' milk.

The first of these is the healthy condition of the cow at the time of milking, and the second is the preservation of milk in a condition as nearly akin to its normal condition as possible. Without argument, it may be assumed that cows' milk cannot be normally secreted from tissues

that are not in a normal condition. Experience has further shown that by injections into the blood of chloroform, atropine, etc., alterations take place in the blood by which immunity is removed. For instance, Klein produced anthrax in rats after having administered chloroform, it acting as a depressant. Some of these blood changes are readily observable, and, as would be expected, such changes show themselves by alterations in milk—a normal secretion of the tissues. Take the disease of tuberculosis in cattle; after both feeding and inoculation experiments, it is seen that a daily rise of temperature in rabbits, pigs, calves, etc., takes place of 3 or 4 degrees F. Similarly, although no tubercles of the udder may be present, a daily rise of temperature tends to take place. This has been known in advanced cases to produce a stringy condition of milk and precipitate on standing.

Now these facts may be taken advantage of in a practical way in our efforts to determine what constitutes a normal milk. Thus we are brought naturally to the study of milk as a physiological product. Whether viewed simply as a constituent directly of the blood itself, obtained by osmosis, or as a secretion elaborated in the cells of the milk glands, it is found to have in a normal state certain very well defined relations existing between its various constituents. All know the normal constituents in milk to be as generally stated, fat, and solids not fat, which latter are composed of sugar, proteids, and ash. For many years chemists, and of recent years agriculturists, have been intently engaged in determining, from the commercial standpoint, the relative proportions of these, and especially of the so called butter fat. For our present purpose it suffices to know that different breeds, and different animals of different breeds, give milks which are normal, and yet whose constitutents vary notably within certain very well defined limits. Knowing these facts, chemists and others have argued that there is really no such thing as a normal milk standard possible; but these have argued from a limited knowledge of the facts, or, more probably, limited opportunities for drawing general conclusions. Very recently it has been found that while the butter fat in different animals may notably vary, yet if the cow is known to be healthy, and no abstraction of fat nor addition of water has taken place, the several constituents of milk bear to one another a tolerably definite relationship. Contrary to the old idea that milk high in cream or butter fat would show a lessened amount of other constituents, it is now known that with the percentage of butter fat high the other solids are present in a proportionately larger amount. Thus, Professor Cochrane, analyst to the Pennsylvania Board of Agriculture, gives the following results at 60 degrees F.:

No.	Sp. gr.	Fat.*	Total solids.	Solids not fat.
1	1,029.6	3.38	11.33	7.95
2	1,030	3.62	11.93	8.31
3	1,029.3	3.63	11.63	8.02
4	1,033	5.70	15.64	9.94
5	1,034	5.35	14.87	9.52
6	1,034	5.19	14.70	9.51
7	1,034	5.88	15.48	9.60
8	1,034	5.05	15.69	9.64
9	1,034.3	5.95	15.60	9.55
10	1,035.2	5.70	15.60	9.90

Hence, it is very properly concluded that the lactometer, or lactodensimeter, is an instrument of much value in testing a milk from the standpoint of adulteration. Thus, a milk of low specific gravity and low in solid constituents would indicate the addition of water; a milk of high specific gravity and a low percentage of fat is probably skimmed; and a milk having a low specific and yet a high percentage of fat indicates either a very good milk watered, or an unfair sample taken from the creamy portion of the milk.

From many thousand analyses made by Dr. Paul Veith, F.C.S., analyst for the Aylesbury dairy, London, England, during eight years, broad general conclusions have been drawn. During those eight years he analysed 84,746 samples of milk, and has preserved records of great value, from which the following are some of the more important deductions; He found that the non-fatty solids are the most constant factors in milk, having the following relations to one another:

Total non-fatty solids { $\frac{6}{12}$ . . the milk sugar, $\frac{1}{12}$ . . mineral matter (ash), $\frac{5}{12}$ . . the nitrogenous matter ($\frac{2}{3}$ of this being caseine).

He likewise found that milk from cows fed with the same food shows a remarkable constancy of specific gravity, rarely falling outside the limits of 1,030 to 1,034.

* Per cent.

As regards quantity, he found that the morning milking stands in relation to the evening as 100 to 72, accounted for, he thinks, by the fact of the cows having before them water during the night, and no food after the evening meal. The great increase shows a difference in quality, but not of an amount to offset the difference in quantity. Thus, analyses made on eleven different days showed in one cow (a type of the others) that the amount of pounds of milk-yield averaged

14.4 pounds at morning milking,
10.2 pounds at evening milking.

Fat solids { 3.5 per cent at morning milking.
4.1 per cent at evening milking.

Non-fatty solids { 9.13 per cent at morning milking.
9.32 per cent at evening milking.

That these results are constant, may be seen from similar experiments made at the Agricultural College, Guelph, Ont. The following are the results of the average of one week's examination, by Prof. C. C. James, of the milk of six cows by the Babcock tester to show butter fat:

Cow.	Morning milk.	Evening milk.
No. 1	3.25 per cent.	3.96 per cent.
2	2.76 "	4.00 "
3	3.18 "	4.33 "
4	3.42 "	4.45 "
5	2.75 "	4.18 "
6	2.63 "	3.70 "

Dr. Veith further found that the quality of milk reaches its height in November, while in the spring months the poorest milk is received, with another depression in July. The returns were gathered from thirty to fifty farms, and fresh milch cows are obtained at all seasons of the year. It would therefore appear that at these seasons the variations depend upon climatic changes, since the amount and kind of food consumed on the same farms are much the same throughout. There can be no doubt that an influence of an important nature is exerted by weather changes. Thus, a sudden fall in the barometer, and a raw easterly wind, will in twenty-four hours lessen the yield of one hundred cows by a number of gallons; and a sudden accession of severe cold will, for a day or two, notably lessen the milk-flow. Great heat in the summer similarly affects the milk-supply. But the most notable differences depend upon the kind, amount and methods of feeding. The physiological factor, the perfect or imperfect metabolism of digested products, in other words, the character of the soluble constituents of food entering the stomach and the digestibility of other foods—forms the most potent factor, under ordinary conditions, in influencing the amount and quality of milk. Ensilage of any kind will give to milk its special flavor, and produce a certain quality as regards richness and permanency; so also will such foods as bran and various ground grains; and the same is the case with brewers' grains, fresh or fermented; refuse starch-products, and so on to distillery slops.

Now while there is no doubt that milch cattle become habituated to certain foods unnatural to them, yet the experience of close observers shows that milk always has a physiological normal constitution dependent upon the perfect metabolism of wholesome grains and grasses, and that other foods do produce in some degree abnormal products. All dairymen are aware of how leeks in spring-time flavor the milk, and dairymen are very well aware that so simple a thing as turning cows from permanent pasture into a clover field will produce so notable a taste as to cause complaints of something having gone wrong in the milk.

This subject opens up a wide field for investigation, which as yet has received but little attention, even from the sanitary standpoint. From more or less general experience, the impression exists that the milk of cows fed with refuse grains and ensilage, all including some starch or sugar more or less altered by the alcoholic or acetic ferments, has not the keeping properties of the milk of cows fed with hard grains and grasses. The diarrhœal troubles in children have not infrequently been attributed to this cause. I am not aware of any extended experiments going to show that such milk contains an excess of sugar, and, as already mentioned, Dr. Veith states from his many analyses that sugar maintains its average proportion of one-half to the non-fatty solids of milk, and that these constitutents maintain throughout a remarkable relative constancy. On many of the farms of the Aylesbury Company, brewers' grains are fed, but it may very well be that in the English climate fermentative changes are ordinarily slower than in the warm weather of this country.

This point naturally brings me to speak of the acidity of milk, and its relations to normal physiological processes. We are aware that milk is spoken of commonly as being a practically neutral secretion, giving slight reaction with both red and blue litmus—in other words, being amphoteric. In reality, however, normal milk, owing it was thought to a certain amount of

carbonic acid dissolved in it, ought to be considered as acid. Dr. Wynter Blythe by experiment has shown that milk contains, in a litre of fresh warm milk, 1.83 c. c. of gases—carbon dioxide, .06 c. c, or 3.27 per cent. : nitrogen, 1.42 c. c. or 77.60 per cent. : oxygen, 35 c. c. or 19.13 per cent. ; and that standing increases its carbonic acid by a certain amount of oxygen absorbed.

It is questionable, however, whether milk does really contain when freshly milked any appreciable amount of carbonic acid, since by experiments carried on in the laboratory of the provincial board of Ontario it has been found that the acid reaction found in milk just drawn does not alter on boiling, by which process carbonic acid would be driven off if present as a free acid. It has further been found that milk, if rapidly aerated and cooled, does not increase in its acid reaction.

The following results of experiments carried on in a large dairy near Toronto by my laboratory assistant, Mr. J. J. McKenzie, will be found of great interest in determining this point :

The standard normal solution of caustic soda (40 grammes to 1 litre of water) was prepared and added to milk just drawn from the cows into clean sterilized flasks. The point of acidity was delicately determined by pheno-phthalein having been previously added to the milk. It will be seen that the acidity of milk may be represented as having an average of 1.1 in a series of individual milks, or in the mixed milk from a herd of one hundred cows : that is, 1.1 cubic centimetres of normal caustic soda solution was necessary to neutralise the acidity present. As these cows had been fed month after month on fresh cut hay mixed with bran and pea-meal, and on the grass for a few hours each day, it may be said that the food was the best possible for determining what is the normal physiological acidity of milk. From the fact that carbonic acid does not seem to be a factor in this acidity, but that it depends upon some acid basic salts (probably phosphates) present, it will appear that in the determination of the acidity of milk we have a method of much value in not only testing the effects of different foods on milk, but in estimating the changes which go on in milk under the influence of bacterial ferments of various kinds.

At this point I enter upon a part of our subject so interesting and yet so intricate, that I confess to having some fears as to the propriety of my attempting to deal with it : and yet, I am convinced that until the biological factor in the study of milk has been followed with the same assiduity as has the chemical, we are not likely to greatly increase our present knowledge on the subject.

Starting then with the facts just related regarding the acidity of milk, I believe it will be found that, under ordinary conditions, the determination of the acidity of any milk will serve as a measure of the degree of bacterial infection which has taken place, and of its fitness for use as a food. For instance, in the experiments which I have recently been directing, a milk, which showed 1.1 degrees of acidity both at milking and after aerating and cooling by a method adopted at a large dairy near Toronto, was placed in quart bottles, which had been well washed in a warm soda solution and afterwards rinsed in clean water and drained and aired for some hours, and thereafter placed in a refrigerator having a temperature of 40 to 45 degrees F. These bottles were covered with a flat metal cap and allowed to stand. After five days their acidity was tested, when it was found to have remained unchanged from the normal 1.1 degrees, and the milk, to the taste, seemed in every way normal. Now from this it may fairly be concluded that while the milk must have been infected to some extent with the lactic acid ferment from contact with the sides of the milk pails, cans and bottles, yet the treatment of the milk by aeration, and its subsequent retention at a low temperature, served to delay for the length of time stated the multiplication of the bacillus lacticus, or, indeed, of any other microbe whose multiplication produces an acid reaction.

These facts lead us to enquire whether the care exercised in drawing the milk, in cleansing cans, bottles, etc., may not so minimize the amount of bacterial infection as to make it possible for the defensive proteids, or tox-albumins, which I assume to be present in milk, to so exercise their bactericidal influence as to actually destroy the greater part of the bacilli lactici necessarily introduced.

Fokker has shown that there is in fresh milk some compound present which actually does exert this destructive influence. From an intimate knowledge and observation for several years of the working of a large dairy and of the keeping qualities of milk, I have for some time been of the opinion that what are known as the animal odors of milk exert an important influence, both directly on the wholesomeness of milk and upon its keeping qualities. It is well known that milk, taken from a healthy cow at night and placed warm in a small pail and covered, will retain flavors to a disagreeable extent, and emit an odor, often very disagreeable. It has, hitherto, I believe, not been seriously attempted to isolate these volatile organic compounds, which by aeration and chilling are so readily caused to disappear, although Wynter Blythe in his examination of the gases of milk might naturally have been expected to recognise their presence. He, however, seems to have found only those gases of which a table of amounts has already been given. That they are highly organised nitrogenous compounds I readily believe, and that in themselves they may in some instances be noxious, I have thought possible. For

instance, we are aware that nursing mothers, under extreme nervous excitement of a depressing character, may secrete milk which will cause convulsions in the child; while I have known the milk of a nervous Jersey cow, tethered during the day in a corner of a city park where she was worried by boys and dogs, to secrete a milk which almost invariably was altered between night and morning so as to be totally unfit for use. Such facts remind us of the curious "Gemeingefühl" theory of Jaeger, whereby, under pleasing mental states or the opposite, volatile odors are produced in the body, in the one case, stimulating the heart to full vigorous pulsations; and in the other, depressing notably the heart's action, and so affecting nutrition.

Whatever be the cause of the conditions to which we refer, we learn from those engaged professionally in dairying that there are many variations in the minor constituents of milk, which seem to notably affect its coagulation, etc. Thus, this albuminous substance seems to vary, notably in amount, according to the age of the milk, and doubtless according to the healthy character of the mucous membrane of the udder and teats.

After making all allowance for these minor variations in the constitution of milk as affecting its wholesomeness as a food, it must be confessed, however, that the care of the milk, in its handling from the time of taking it from the cow until it is consumed, is by far the most important element in the question of its fitness for food. Milk taken under the best ordinary care in stables is by no means as free from bacteria as it might be; but as too commonly taken, it is absolutely laden.

The following is the result of a bacterial analysis of milk, taken by my laboratory assistant, in a large stable, where the milk is supposed to be handled with unusual care as regards cleanliness: Gelatine plate cultures were poured, one half c. c. of milk being added for each culture. After three days, maintained at the laboratory temperature of 68-70 degrees F., the various plates giving the following results:

ANALYSIS OF MILK (BACTERIOLOGICAL) AT DIFFERENT STAGES OF TREATMENT.

Average of two samples.

I. Direct from cow: no precautions except milk received into sterilized test tube, 15 microbes per c. c.

II. Pail in stable receiving milk from different cows; milk strained through a cloth, 720 per c. c.

III. Milk from cooling apparatus after cooling, 884 per c. c.

IV. Milk from bottles immediately after filling, 1,640 per c. c.

As regards normal milk acidity:

Oct. 7. Six cows gave the following: .95, 1.06, 1.27, 1.12, 1.20, 1.09—average, 1.11. Kept in all day; 1.11 c. c. of normal soda required to neutralize. Average of mixed milk of 100 cows on cooling, 1.11.

Oct. 8. Cow No. 2 of above series, 1.10; No. 3 (back lamed), 1.50; No 4, 1.00; No. 5, 1.01. Out all day pleasant days. Mixed milk, 1 10. After standing in refrigerator, for four days at 40-45 degrees F., 1.10, 1.50, 1.00, 1.01—average 1.11. All milk aerated, but not otherwise sterilized.

These results are remarkable, and illustrate Bitter's (of Breslau) conlusions that air contamination is the merest incident as compared with that due to the hands of milkers, strainers, and other various utensils used. It is not then difficult to understand how, with a slow process of cooling from 100 degrees F. down to air temperature, very favorable conditions have been present for the multiplication of germs.

It is curious to note how many explanations other than the bacteriological one are given for milk changes by professors of dairying. Professor Arnold illustrated in his work a peculiarity, which, during the warm weather of a particular summer, occurred in Rochester milk, by which, after the driving of milk in wagons a few miles from the country, it was found to be coagulated while showing no marked acid reaction. This is now known to be due to certain bacterial forms different from the common acid producing forms.

Speaking of the bacteria of milk, much good work has been recently done on the subject, and some very interesting results have been obtained. Of these, those carried out by H. W. Conn, Ph. D., at the Storrs experiment station, Connecticut, are of much interest. He has, as might be expected, found almost innumerable bacterial forms in milk; but there are principally three classes, distinguished by the effects of their action on the milk. These are, briefly,—(1) The bacillus *acidi lactici*, and perhaps allied forms which change the sugar into lactic acid and carbonic acid, and coagulate caseine into a hard mass, are aerobic, and do not liquify gelatine. (2)

The second class curdle the milk without rendering it acid. These forms liquify gelatine, produce spores, and are anaerobic largely. The curd formed by these is soft and jelly-like. (3) A third class, as *oidium lacticum*, seem to be common in milk, and yet produce no marked coagulative effects or acid reactions.

That, however, the various decomposition changes which occur in milk, cheese, etc., are due to bacterial action, may be realised from the fact that milks kept under various conditions have shown bacteria ranging in numbers from 300 to 6,000,000 per c. c. How they may multiply is seen by the single illustration that milk which had been kept for several days in a cool place and then showed 10,000 bacteria per c. c. was afterwards allowed to stand in a warm room some six hours, and during this time the bacteria increased from 10,000 to 1,000,000 per c. c.

Now I have intimated enough to fully set forth the fact that milk sterile on milking becomes at once contaminated under ordinary circumstances: but that the rapid development of sourness really depends upon the subsequent conditions.

Fokker, of Groningen (Holland), has given figures showing that for a short time milk seems to resist bacterial growth. For instance, he added a measure of bacterial broth to milk, and found that—

1 c. c. of milk then contained 120 bacteria:
1 c. c. of milk contained after 24 hours 10 bacteria:
1 c. c. " " " 48 " 2,200 bacteria:
1 c. c. " " " 72 " innumerable bacteria.

He further indicated, what Duclaux and others had pointed out, that the resisting power of milk is lessened by sterilization, since, if subsequently inoculated, he found it invariably coagulated in twenty-four hours.

But aside from all these special conditions there stand out the broad facts, within common experience, that good milk taken carefully does form under ordinary conditions, an admirable culture medium for various bacteria, but especially for the common sour milk *bacillus lacticus*. I give but one of our experiments: Four sterilized tubes were filled with milk and plugged with wool; two lots being directly from the teats of the cows after careful washing, and two from the mixed milk after aeration and cooling. All were exposed to the laboratory temperature, and at the end of thirty hours all were coagulated, and showed practically the same degree of acidity measured by the normal alkaline solution.

From the results of the plate cultures already given, we have seen that the milk at these two stages showed a very notable difference in the number of bacteria present: yet in practice this amounted to very little, so long as any inoculation at all had taken place and the temperature was favorable for rapid bacterial growth. On the other hand, as might be supposed, there are degrees of purity as regards bacterial contamination: and a milk, if carefully taken, is much more likely to remain sweet if kept cool than if much contaminated.

Bitter has found that milk in sterilized and unsterilized cans varies greatly in keeping properties after Pasteurization. Thus:

Sterilized cans.	Unsterilized cans.	Temperature.
46 hours.	24 hours.	25 degrees C.
96 "	48 "	15 "
72 "	24 "	23 "
130 "	65 "	14 "
86 "	48 "	19 "
104 "	66 "	14 "

But that temperature is the main factor, has similarly been shown by Bitter in his experiments with Pasteurized milk. Thus when heated to 68 degrees C and thereafter chilled, the following results were obtained:

At 30° C. milk remained good 6-8 hrs. longer than un-Pasteurized milk.
" 25° " " " 10° " " " "
" 23° " " " 20° " " " "
" 14°-16° " " 50-70 " " " "

Bitter has determined after numerous experiments to make an arbitrary standard of goodness of milk by counting the number of bacteria in the sample. Milk, according to this scale, is good if the number of bacteria falls under 50,000 per. c. c. Above this it becomes doubtfully good, and when 2,000,000 per c. c. are present it is absolutely destroyed. He concludes

that, with regard to the preservation of milk, Pasteurization at 68 to 75 degrees C. is safe at ordinary temperatures; that in hot summer weather it will keep at least thirty hours longer; and that at this temperature the taste and flavor are not altered and cream production is not affected.

Manifestly, however, with ordinary methods, as we find them, in the care of milk, temperature, of all factors, has the most important bearing on the keeping of milk. I cannot do better than conclude these studies with a quotation from a recent critique, by M. Duclaux, "Sur la sterilisation du lait." He says:

"It seems to me that in place of always marching forward in this direction, it would be useful to retrace our steps, and ask ourselves if it would not serve better if we should avoid all necessity for heating, in preventing absolutely the introduction of all hurtful germs into the milk. In the conference, held on the 7th of June, 1889, in the Trocadero, during the Universal Exposition, I said, 'that milk, properly taken in a stable properly kept, by a milker who had first washed his hands and the teats of the cow, would not coagulate more quickly than milk taken without care, and having carbonate of soda added to it to mask the defects of cleanliness.' * * * 'It seems to me that in this direction lies progress, at least for milks destined for rapid consumption, and not from the side of the multiplication, or making perfect, of apparatus for Pasteurization.'"

Summing up, then, some of the practical conclusions to be derived from our studies, I would briefly formulate the following, as methods likely to conduce to an improvement in our public milk supplies.

1. After intelligent dairymen have selected their cows, it is especially desirable that a system of periodic veterinary inspection, in addition to the dairymen's inspection be exercised, under the municipal health department, of all milch cows supplying milk to the municipality.

2. From what has already been said it is manifest that strong views should be held and taught regarding the nature and quality of the food of milch cows, whose milk is intended for public supplies. Not only has it a direct influence on the general health of the cow, but the condition of the milk at the time of taking, and also its keeping qualities, are undoubtedly in no small degree dependent on the character of the food supply. All decomposed foods, as those which are liable to undergo fermentation, should be wholly avoided. As already mentioned, the best foods are the well ripened grains and grasses, well cured and free from weeds, fed in such a manner as to supply the various milk constituents in proper amounts, and in such a way as to promote easy digestion and proper assimilation.

3. The stables of the cows are manifestly a point of great importance. Too often, dark, damp, ill-ventilated, and crowded pens have been the home of this chief of our food supplies. It is quite possible, as hundreds of dairymen and farmers have shown on this continent as on the old, to keep, even on a large scale, a dairy stable free from the ordinary disagreeable stable odours, to give the cows abundant ventilation, and to so conduct the feeding, that cows, taken from the ordinary barn-yard feeding of the farmers, will readily improve in general appearance and increase greatly in milk and in flesh. The water supply to the cows is of equal importance. Too often, the barn-yard pool, or sewage-tainted creek, or cheese factory drainage, are the sources from which the dairy cattle drink; and not even to mention the more delicate physiological effects of such water, cheese makers tell us that they can distinctly note the gross effects of cows drinking filthy waters by the degraded quality of the milk which at times, comes to their factories.

4. The care of the milk at the time of, and subsequent to, taking, is, however, of all points at once the most difficult of control and the most necessary to supplying a wholesome milk. We have pointed out wherein the difficulties lie, and would only say, as Duclaux has said, "Cleanliness everywhere is the *sine qua non*." That it means almost a revolution amongst farmers and dairymen, as regards their methods, is apparent; but as Duclaux neatly says, "Producers will quickly find the means (of cleanliness and a reform in their methods) if consumers wish strongly. When people demand clean milk, they will have it. They will always have to boil milk before using, when they are not sure of the condition of the cow that furnished it, but the question will not the less have taken a great step in advance when milkmen and milk-maids know all that is implied in cleanliness." Hence, the sterilizing of the cow's teats by washing, the sterilizing of all cans and bottles by steam or dry heat, and the boiling of all cloth strainers will be necessary. Aeration and rapid cooling are of enormous influence in delaying, as we have seen, the multiplication of bacteria, and I am convinced that the placing of milk in a refrigerator over night, at 40 45 degrees F., and allowing the cream to rise in well stoppered bottles, conduce together to the greatly increased permanency of the normal milk condition.

5. The delivery of the milk is similarly of prime importance. If placed to cool in sterilized bottles, at a low temperature, the layer of cream tends to prevent agitation in the bottles, and where the bottles are packed at the same time in accurately fitting compartment boxes, these

exactly fitting into wagons specially designed for them, the agitation or disturbance of the milk in transit will be reduced to a minimum, and the introduction of oxygen be lessened. The numerous details in this regard need not be further referred to here.

6. Finally, when the milk has reached the consumer, it must be placed in a refrigerator, or promptly consumed. If in the former, I have known milk in summer weather to retain its sweetness for three or four days when precautions such as I have spoken of are present.

7. In case the Pasteurization of milk is introduced into practice by dairymen, it is necessary that the same care should be exercised in keeping milk cool, after heating to 68 or 70 degrees F., as is necessary under ordinary treatment.

In conclusion, I may say that it is my opinion, after very carefully studying the processes and results of a large dairy for four years, that, with carefully selected and inspected cows, as regards freedom from disease, notably tuberculosis, the taking of milk with care as to cleanliness in the particulars already given, to aerating the milk to remove the volatile animal gases, to bottling in sterilized and well stoppered bottles, and the placing them promptly thereafter in cold storage, at 40-45 degrees F., with careful handling in delivery, will be found to present so many practical advantages, both as regards the tastes of the consumer and the convenience of the dairymen, that sterilization in other respects will not be likely to be found necessary, or find general adoption.

P. H. Bryce.

CHAIRMAN'S ANNUAL ADDRESS.

BY J. J. CASSIDY, M.D., TORONTO.

To the Members of the Provincial Board of Health of Ontario :

GENTLEMEN,—It is scarcely necessary to say that Medical Health Officers throughout the Province regard the enforcement of clause 80 of the Public Health Act, which provides for the compulsory reporting of infectious diseases, as of the very first importance. It is pleasant to note also that the physicians on whom the duty falls of reporting these diseases, have, with few exceptions, fulfilled the requirements of the law. Compulsory notification of contagious diseases, advancing with the growth of sanitary administration in different countries, became law in Germany by a series of successive regulations of the different States from 1835 to 1880, in Hungary by the sanitary law of 1876, in Denmark since 1875, in Holland since 1872, in Italy by one general sanitary law of 1874, in Portugal since 1868, in Servia by the law of 1881, in Sweden since 1874, in Norway since 1860, in the United States, by different special Acts for the several States from 1872 to 1880, in Canada, by special Acts in some of the Provinces, since 1884. In England also a recent Act (August 30th, 1889,) provides for dual notification, *i.e.*, by the head of the family to which the patient belongs, and also by the attending physician. In this Act the expression "infectious diseases" in the meaning of the Act comprises the following diseases :—smallpox, cholera, diphtheria, membranous croup, erysipelas, scarlet fever, typhus, enteric, relapsing, continued, and puerperal fever.

In France also, where the initiative in this question of notification by the physician was begun in 1822, it is contemplated to introduce a law which will be of the same character as the enactments passed in other countries.

In enforcing this wise provision of our law difficulty occasionally arises owing to the fact that physicians resent the appearance of health inspectors in houses where they are attending cases of infectious disease. Looked at from the broad platform of the public good, and supposing that both parties are sensible men, we fail to see why any difficulty should occur between the Medical Health Officer and the attending physician. The former aims at removing from the household all possible and probable sources of infectious disease ; the latter directs his energies to the treatment of patients poisoned with these same diseases, in many instances, alas, too profoundly to be rescued from death by even the best judgment or most highly trained ability.

Ever since the formation of this Board evidence has been accumulating from every county of the Province showing the close connection between impure water and typhoid fever ; that cholera does not occasionally prevail amongst us is simply owing to the fact that the seeds of that disease are not regularly added to the water as they are in China and India. As a writer in the *Sanitary Era* of New York says :—"Of the two great foul-water plagues, typhoid fever and Asiatic cholera, the former is endemic and nearly continual in its ravages ; while the latter is more limited as to places and seasons, but more concentrated and terrific in its onsets." Port Arthur, a city in northern China, which previously lost a large part of its residents each year through cholera, typhoid fever and other enteric diseases, is now comparatively free from epidemic diseases. This is solely due to the energetic measures taken by the French years ago in building a system of water-works and thoroughly cleansing the Chinese part of the city. *Mutatis mutandis*, what is here narrated of a Chinese town would apply equally (cholera being omitted) to some towns in Ontario where the ravages of typhoid fever are known to be considerable.

In view of the law, see section 30 of the Public Health Act, that plans relating to proposed water supplies should be submitted before their adoption to this Board, municipalities in Ontario should govern themselves accordingly, otherwise they may put themselves in the position of the municipality of Parry Sound, where a by-law providing for the erection of water-works has been illegally submitted to the people, the plans not having been previously sent to this Board.

In the matter of ice supplies the Toronto Board of Health has recently taken the position that the dirty ice of Toronto Bay can be safely used for cooling purposes by brewers and butchers. If the foul stuff is simply allowed to melt and return by the sewers to its native element no harm can result, but if it should find its way into the stomachs of the people the results will certainly be disastrous. We are glad to see that Dr. Allan was opposed to this concession.

In the matter of milk supplies it is very important that parents should know, as we have already stated, that milk, the common food of the nursery, is a culture medium of the diphtheritic germ. The germ of typhoid fever might also be introduced if impure water were used in washing cans, bottles, etc. The utmost pains should, therefore, be taken by the public to obtain milk from dairies where perfect cleanliness is known to be the rule. When the source of the milk is unknown the safest plan is to subject it to the prolonged action of heat near the boiling point, which destroys all the pathogenic germs.

Although many papers have been and are regularly read at sanitary conventions and similar meetings on the ventilation of public buildings and private dwellings, improvements in the matter of ventilation are few and far between. Windows should be opened in mild weather for at least part of the day, and if raised at the bottom one inch and lowered at the top an equal amount excellent ventilation can be secured with little danger of draught. The method suggested by Dr. Cotting of raising the lower sash a few inches, and inserting beneath it a board the width of the window, secures a considerable ventilating space between the two sashes at their point of junction. Dr. Rose burgh, of this city, has patented an ingenious plan of window ventilation, which can be applied at a small expense. As an addition to practical hygiene we may also mention the perforated window panes so much extolled by Mr. Emile Trelat. As the learned professor says :—"Fresh air ought to be regularly introduced in a permanent manner into all inhabited rooms ; hence the sashes ought to be furnished with perforated panes of glass. Panes of glass intended to allow a constant inward flow of the outer air in an imperceptible fashion are perforated with from 2,000 to 3,000 holes to each square metre. The holes widen out towards the inside in order to flush the fluid veins at their entry into the chamber. These panes ought to be used only in rooms having a minimum elevation of eight feet, and they are principally intended for cabinets, closets, etc.

The following letter, which was recently received at this office, goes to show that the people referred to do not seem to take to ventilation very heartily, or that their experience of it must have been accompanied by some alarming details :—

DEAR SIR,—To point the need of unrelaxed effort to educate or compel people to ventilate public buildings, I quote the following resolution adopted at our annual school meeting on the 30th ult.:—"Moved and seconded, that a vote be taken by those present how they feel on ventilating the school-house. Twenty-eight against it, and one for it."

J. DEARNESS,

Inspector of Schools.

Our correspondent does not indicate what was the objection to ventilating the school. It could scarcely have been a dislike to pure, warm air in the school-house. Most probably it was a rooted objection to paying any more bills in these hard times. If this is true, while we sympathise with the economy of our western friends, we would prefer to see it exhibited in a more commendable fashion than in depriving the rising generation of a full supply of the breath of life.

It has been my good fortune, in previous years, to have been present at the annual meetings of the Association of Executive Health Officers of Ontario, and my recollections of the papers read and the discussions held convince me that the Ontario sanitarian is doing his work faithfully and well. The report of the meeting held in Trenton last August is full of instructive and well-written papers, with the individuality of their authors stamped on them, so much so indeed that in fancy's eye I could when reading almost imagine that I was gazing on the scene. Long may such good work continue to

be done, and as each recurring year brings us together, may the bonds of mental similarity and congenial feelings, with the impetus derived from a noble cause, help to make our meetings felicitous in the solution of old problems and fertile in the introduction of new ideas.

Apropos of the latter, it has occurred to me that it would be well if our Provincial University would provide instruction, training, examination, and a diploma for graduates in medicine who wish to become medical health officers. Durham University in England provides a two years' course in hygiene with examination and a diploma as doctor of hygiene. A similar degree is granted at Cambridge. Toronto University might well consider the advisability of establishing a faculty of the kind, which would be certain to receive support not only from the provinces of the Dominion, but also from the United States.

PART III.

REPORT OF LOCAL BOARDS OF HEALTH.

CITIES.

BELLEVILLE.

Medical Health Officer's Report.

I had the usual order issued for the cleaning of yards and premises in the spring which was responded to very well by the citizens generally. I ordered the Inspector to make a house to house inspection of the city, and report to me. When required, I issued orders to abate any nuisance found.

The number of privy pits cleaned and disinfected, 576 ; number changed to dry earth closets, 73 ; number closed, being too near dwellings, 6 ; number of hog pens removed and disinfected, 14. I may say that hog-pens have caused the Inspector a great deal of trouble, owing to the difficulty of keeping such places clean and free from smell.

Number of wells filled up, 7 ; all public wells were thoroughly cleaned out. Number of cesspools cleaned, 5 ; number of cesspools filled in, 2.

The dry earth closets were cleaned monthly, and all refuse matter from yards carted out of the city. The Inspector and myself made frequent inspections of the slaughter houses and premises, and saw that they were kept in a thorough sanitary state.

The city has been very healthy during the past year, and the mortality much lower than any year during my time as Health Officer. The deaths for 1885 being 191 ; 1886, 175 ; 1887, 216 ; 1888, 167 ; 1889, 164 ; 1890, 193 ; eleven months 1891, 118.

No deaths were reported to me from either scarlet fever or measles. One death from diphtheria; the source of contagion in this case being brought from Toronto by parties who lost a child there. Two deaths from typhoid fever during the year ; four deaths from membranous or diphtheritic croup.

The city's greatest want now is a proper system of drainage, which I trust will soon be an accomplished fact. I am very much pleased to be able to report that a thorough system of sewerage is being placed in the Institute for Deaf and Dumb, and, that soon, all danger of the sewage from that place, affecting our water supply from the bay, will be removed. I cannot close this report without giving credit to the Inspector for the energetic manner in which he performs his duties.

R. TRACEY, M. D.,
Medical Health Officer.

BRANTFORD.

Medical Health Officer's Report.

Mortuary Statistics.—The number of deaths occurring in the city during the year was 168. This gives a death rate of only 11.75 per thousand in a population of 14,280. The number of deaths is much less, and the death rate is much lower than they were in any since the organization of this board, seven years ago.

The causes of death, from the principal preventable diseases, were as follows, with comparisons with several previous years :—

	1891.	1890.	1889.	1888.	1887
Typhoid fever	6	11	9	13	8
Diphtheria	5	6	13	10	19
Scarlet fever	1	0	1	0	2
Measles	0	1	1	1	0
Whooping cough	1	1	4	5	7
Cholera infantum	20	10	18	26	33
Consumption	2	22	18	17	21

The mortality in typhoid fever has varied from nine to twelve per cent. of the cases reported or known. Thus there were sixty-four cases this year, and six deaths; last year eighty-eight cases and eleven deaths; in 1889, ninety-six cases and nine deaths; in 1888, 117 cases and thirteen deaths; and in 1887, 112 cases and eight deaths.

Typhoid Fever and Impure Water.—Careful enquiry concerning all the cases of fever this year, shows that sixty-three out of the sixty-four victims were drinkers of unboiled well-water. In some of the cases the water was said to appear "very good;" in many cases, "not very good;" and in several cases, "very bad."

It is established beyond any doubt that the most potent factor in the causation of typhoid fever, is, impure drinking water, especially that exposed in any way to contamination by human excretions.

Fever in Eastern Cities.—It is a surprising fact, which has often been commented on, that many great eastern cities, such, for example, as Tokio and Canton, where water supplies are very impure, whose general sanitary condition is extremely bad, and where death rate is very high, have, nevertheless, a comparative immunity from typhoid fever. The explanation of this remarkable fact is to be found in two other facts. The first fact is that their water supplies, however filthy, are not often contaminated by human excretions; such excretions being speedily conveyed to the country and converted into fertilizers. The second fact is that, good or bad, they don't drink the water. In other words, the use of raw or unboiled water in those cities is practically unknown, the prevailing drink being tea.

Examples from American Cities.—The relation of contaminated water to typhoid fever is well seen in the mortuary reports of American cities, for the last twelve months. Take for example Brooklyn and Chicago. Brooklyn has a good water supply, and has a typhoid death rate of only seventeen per 100,000, while Chicago, which gets its supply of water from the same reservoir into which it discharges its sewage, has had the fearful rate of 152 to the 100,000. If you look at Toronto, into whose water conduit bay sewage has been leaking, you will have a typhoid rate this year exceeding fifty, which, although only one-third that of Chicago, is three times that of Brooklyn. Brantford, which has depended thus far mainly on well-water, generally impure, has a rate this year of forty-one; the rate for the four previous years having varied from sixty to ninety. It is interesting to notice that the total general death rate of the four cities named, was as follows :—Brooklyn, 25.28; Chicago, 23.65; Toronto, 15.60; and Brantford, 11.75 per 1,000.

Brantford a Healthy City.—It is very satisfactory to report such a very low, general death rate for Brantford: it is also satisfactory to know that the amount of diphtheria, scarlet fever, etc., has been small, much less than for many years past, because it thus appears that the general sanitary condition must be good, and that Brantford is a very healthy city. It is not so satisfactory, however, to know that a purely preventable disease like typhoid fever, should continue unduly prevalent, and I have in this report referred to this matter more particularly because I feel it is not necessary that this should be so.

Typhoid Fever Should be Stamped out.—There is no reason why this disease should not be practically abolished, stamped out, in this city; and if the people choose to avail themselves of the means now within their reach, an excellent water supply and drainage system, and wholly abandon drinking water from wells whose only source of supply is the city rainfall, imperfectly filtered through a polluted soil, this disease will practically cease

to exist in Brantford. There must also result from the adoption of these means, a diminution of the amount of general sickness, and a substantial improvement in the public health. In the experience of Brantford for many years, the lower the water in the wells the greater has been the amount of fever. The reason is that the less water there is in them, the filthier it is; the contaminating sewage being the less diluted. Thus, where sewers have lately been constructed, many wells have been more or less dried up, the ground water which supplied them running off in the drains. Some of these wells, which formerly gave a large supply of apparently good water, now give a small supply of obviously impure water. These facts explain the undue proportion of fever on the high and dry plateau in the East ward. Entirely surrounded by low land, its well water is wholly derived from the rain which falls in the immediate locality, and is not increased and diluted, as in most other localities, by supplies from a larger radius; it is therefore especially liable to a high degree of contamination.

Water in West Brantford.—In West Brantford the public water supply is not available in winter. This defect should be speedily remedied, either by protecting the pipe crossing the bridge from frost, or otherwise by carrying it under the river. It is a serious matter that the residents there, who may desire to put in the city water, should be debarred from so doing.

Testing Water.—Some new and excellent methods of examining water have lately been devised by Mr. McGill, assistant Dominion analyst, which were highly approved by the Health Officers' Association, and by the Provincial Board of Health. I had the opportunity at the meeting in Trenton, in August last, of practically working out these methods by assisting Mr. McGill in examining a large number of samples from Trenton wells. We have recently obtained for our office the apparatus required for this work, and will be able hereafter to demonstrate the qualities of any samples of water with exactness and certainty.

Diphtheria, Scarlet Fever and Measles.—There were thirty-two cases of diphtheria reported during the year, of which five were fatal: and there were twenty-one cases of scarlet fever, only one having been fatal.

The system of notification in regard to these diseases, and prolonged exclusion from school even in the mildest cases, has been well carried out, and has apparently been successful in preventing their spread where they have occurred.

In regard to measles, the regulations are not enforced with the same stringency because the epidemic which prevailed in the spring, though very wide-spread, was exceedingly mild. Two hundred and twenty-six cases were reported, but there were no deaths. Children from affected families were, however, excluded from school for brief periods. The crowded and ill-ventilated condition of the temporary school-rooms then in use, were, I think, largely responsible for the great diffusion of this epidemic.

Two hundred and ninety-six notices regarding contagious diseases, were sent to the various schools, and 147 to the free library during the year.

The Public Schools.—I have personally inspected all the schools: the Central Ward and Separate schools and Collegiate Institute, not only with regard to the measures used to prevent the spread of contagious diseases, but also in regard to ventilation, heating, lighting, water, cleanliness, etc., all of which are so important in relation to the present and future health of the children.

So far as the Central school and Collegiate Institute are concerned, there is not much left to be desired in any of these matters. In the ward schools some improvements are rather urgently required.

Milk Supply.—The milk supply of Brantford for the past year was derived from twenty-three dairies, having 412 cows. Samples from nearly all the dairies have been inspected four times, or once in each quarter, and all the dairies, and all the cattle, have been inspected twice. Over 2,400 quarts have been delivered daily, and the whole cost of the milk supply of Brantford during the year, was about $44,000.

The average strength of the milk in butter fat was 3·60 per cent.; in the years 1888-9

the average strength was 3.20 ; the gain amounts to 12½ per cent. A substantial annual gain to the city, in the matter of its milk supply of about $4,000, may therefore fairly be ascribed to the operation of the Public Health Act.

Knowing as we do that the value of milk may be reduced by the addition of water, by the removal of cream, or keeping back of strippings, and also by improper feeding ; knowing that it may be, and often is, a fertile source of cholera infantum and similar affections, that it has frequently caused fatal epidemics of typhoid fever, scarlet fever and diphtheria, and that the milk of tuberculous cows may transmit consumption, and finally, that with regard to no other article of human diet, is it so different for the public to protect itself, the necessity for frequent inspections and examinations is manifest.

Sanitary Inspection.—The books of Inspector Adams show that 1,285 inspections of premises were made during the year, as compared with 784 in 1890, the details of all of which are recorded. The four small slaughter-houses within the city were frequently inspected, and they have been kept with great care. Two slaughter-houses in the annexed district, which were in a bad condition, have been discontinued. Four hundred and seven complaints of nuisances were made, all of which were investigated.

Samples of water from seventy-three wells complained of, were examined. Thirty of these were so bad that they were filled up by authority of this board. A number of others were voluntarily filled up by the owners.

City Contractor.—The number of pits and cess-pools emptied during the year was 485, of which 330 were by the order of the inspector. Of these, eighty-one were filled on the inspector's order, in conformity with resolution heretofore passed by the board, and twenty-two were voluntarily abolished. No new pits have been dug during the year. The dry earth closet service book shows shows 1,408 closets, for nearly all of which there is a monthly service. It is estimated that there are about 200 others not in the contractor's books. The whole of the service, I am glad to report, is now working satisfactorily, no complaints of any kind, either as to the service or as to dumping, having been made for a long period. In view of the difficulties with which many other cities are almost hoplessly contending in this respect, we have good reason to be well satisfied.

Owing to the limits of this report, I defer to another meeting, reference to a number of important matters.

I have alluded in this report to the waterworks and drainage system of Brantford, works which the city has undertaken within the last few years, and is now carrying towards completion. The importance of these works in their sanitary relations is not questioned, but there are those who think that much of the drainage work is premature, and will be unduly burdensome. I am confident that the results will soon establish the contrary.

It was understood at the outset that the introduction of a public water supply must be at once followed by a drainage system, otherwise the city would become damp, sodden and filthy, from the great increase of liquid refuse infiltrating the soil. Such a drainage system, of the most ample and perfect kind, is being constructed, and these systems must be taken together. They are sure to prove the best investment, from a purely financial point of view, the city ever made. At the rate at which the city water is now being put in, the profits arising from the city owning the works itself, will very soon suffice to provide for all the obligations incurred by both waterworks and sewerage.

Water rates will, of course, have to be paid, but they need not exceed the cost of maintaining wells and cisterns.

If Brantford has to contend with any difficulties or dangers in the future, they will not be due to these works ; on the contrary, it is certain that the possession of such most desirable and most excellent equipment will strengthen our position and render our future more assured.

E. GRIFFIN, M. D.,
Medical Health Officer.

GUELPH.

Medical Health Officer's Report.

I have the honor to submit my annual report of the state of health of the city, dating from 1st November, 1890, to the same date 1891. During the year 154 deaths have occurred, being at the rate of 14.61 for 1,000 inhabitants, based on a population of 10,537 according to the last census. One hundred and twenty three cases of contagious diseases have been reported, namely:—five cases of typhoid fever with one death; ten cases of scarlet fever without any death; 108 cases of diphtheria, of which twenty-eight cases have proved fatal.

During the month of July the city was visited with an epidemic of this disease, which has proved very fatal. It has also been prevalent in the neighboring townships, villages and towns; indeed, cases of the disease existed in the country some months before it appeared in the city, no less than twenty-five cases from a distance having been treated in the General Hospital since last January. While in some cases the disease could be fairly traced to a filthy and insanitary condition of the houses or premises, in others to the drinking of water from polluted wells, the majority of cases of the disease broke out in houses which were cleanly kept and their surroundings in fair condition. Now, while I hold that in all epidemics of diphtheria there is some condition of the atmosphere which predisposes persons to contract the disease, I still firmly believe that for its continuance and multiplication there must be food for it to live upon and generate in. This pabulum is furnished by foul air, polluted water and filth of every kind, in a state of decay. This city has a loose, gravelly subsoil through which fluids easily and quickly permeate to a long distance. It is being more closely built up every year, the number of privy pits and cesspools is constantly increasing, the drainage from which is steadily polluting the soil. When a heavy rainfall occurs, the water quickly permeates through the loose soil, carrying with it a quantity of poisonous material which finds its way into wells, cellars and low-lying places. When great heat follows there is rapid evaporation, and the air is poisoned by the emanations from the polluted soil. This condition of affairs must continue until a proper system of drainage is adopted, and I would urgently press upon the members of the City Council the great necessity of making provision for a proper and efficient system of sewerage as soon as possible.

A proper organized plan for the removal of all garbage is also an urgent need.

The very small number of cases of typhoid fever that have occurred during the past three years is a subject of congratulation, particularly as it proves the good condition of our water supply, this disease in the majority of cases being due to impure water.

I regret to have to state that our percentage of deaths this year exceeds that of last by a little over one in one thousand of population, but a larger number of deaths have been of those well advanced in years, no less than thirty-one having occurred between the ages of sixty-five and ninety-one, viz: Three between 65 and 70, eight between 70 and 75, ten between 75 and 80, nine between 80 and 85, one at 91, one at 109. Then 37 deaths occurred at or under 12 months, eight of these being still born children, and even with the unusual number of deaths from diphtheria our rate compares very favorably with past years and with that of other cities, being in 1886 it was 18.1; 1887, 15.14; in 1888, 18.05; in 1889, 13.09; in 1890, 13.49. In the annual report of the Provincial Board of Health for 1890 the ratio per 1,000 of population is given. Ottawa, 21.54; Hamilton, 19.24; Toronto, 16.39; Brockville, 17.88; Brantford, 14.36; Guelph, 13.49. In Hamilton the rate is based upon a population nearly 5,000 less than the last census which would decrease its rate to 17.67, while in Brantford it is based on a population over 500 greater than the last census returns, which would increase the rate to 14.92, while in Guelph the last census gives a slightly larger population than our rate is based on.

T. AUCHMUTY KEATING, M. D.,
Medical Health Officer.

Hamilton.

Medical Health Officer's Report.

The total number of cases of scarlatina, diphtheria and typhoid fever was 208, with eighteen deaths therefrom, being 106 cases less than in 1890, also less by only two deaths. There were thirty cases of measles reported, with one death, there were also a few cases of whooping-cough, mumps, and chicken-pox. The death-rate is the lowest yet of any fiscal year; it is 14.48 per thousand of the population, placing the latter at 47,000. We can, therefore, congratulate the city with having a small death-rate, with fewer contagious diseases.

While on the subject of deaths and contagious diseases I take the opportunity of saying that it is the custom in most well regulated cities to require that a permit shall be had from the health officer before a body is allowed to be removed for burial. Such a rule has not only a medical, but also a legal significance, and I would recommend its adoption in Hamilton. It would prevent the spreading of contagious diseases, particularly so when bodies were removed to distant burial grounds. Such cases occur occasionally in Hamilton, Toronto and probably in other localities, all of which should mutually protect each other; it would also insure getting in the full complement of deaths in time, and and thereby assist your registrar of deaths; it would also cause accuracy in the registration of the causes of deaths registered in the cemeteries, which is not always well attended to; it would also aid justice in cases of death from suspicious causes, giving full time for investigation before burial, rendering the exhuming of bodies less liable to be required. The duty should devolve on the undertakers, for which they might be allowed to charge a small fee for their trouble. The disposal of garbage was fully discussed at the annual meeting of the American Public Health Association held last month in Kansas, and the consensus of opinion was that the disposal of refuse should be completely under the control of health officers. That idea was carried into effect in Hamilton when the scavenger system adopted by the local board of health was first introduced. It has worked well since, and any alteration made will be a retrograde one. Garbage is rotten stuff to use for patronage, and requires discrimination in its disposal. When we find that in a large and populous city like Chicago all garbage is dumped a few miles out into the lake, with the possible danger of contaminating the water supply, and that in other cities all refuse is destroyed in crematories, which do not appear to work with satisfaction, we may well rest content that our method of the disposal of garbage and ashes is the best, cheapest and most useful that we can adopt, although it may not have reached the high standard of perfection so difficult to ascertain.

I desire to call your attention to the difficulty which we frequently find in procuring proper sewer facilities, owing to the fact that unless three-fourths of the ratepayers residing on a street petition for a sewer the remainder must do without it. This rule not only obstructs proper sanitation, but in some cases delays the erection of a better class of dwellings, and consequently the loss of valuable property to the city.

There were 1,073 samples of milk examined, also special samples not enumerated; 147 were under three per cent. of butter-fat, 183 reached three per cent., 340 were over three per cent. and under 3.50, 166 were accorded 3.50 per cent., and 237 were over 3.50 in various degrees up to four per cent. and over. This shows 670 samples below the lowest standard of 3.50. Imperfect as our analysis may seem to be it has been the means of discovering diseased milk, sold as one cow's milk for young children, and shows the necessity which exists for the frequent inspection of milch cows and cow byres throughout the Province by thoroughly competent and reliable inspectors.

I. RYALL, M. D.,
Medical Health Officer.

Kingston.

Medical Health Officer's Report.

The public are slowly beginning to realize that "Cleanliness is next to godliness," that to prevent disease is better than to cure; that it is more economical to keep clean premises than to pay bills contracted through sickness brought on by removable causes, still there is room for improvement along these lines.

If the people would wake up to the necessities of the hour, and present a determined opposition to every kind of filth about the premises they occupy, contagious diseases would find very little foothold. The price we have to pay for liberty from this scourge is "eternal vigilance" on the part of all.

Contagious Diseases.—During the year we have had contagious diseases in our midst, the cause for which we may attribute, in a measure, to the large number of privy pits in use, which are hotbeds for disease germs; foul wells, the water from which has, upon analysis, been found to be polluted, and in nearly every case dangerous to health; to defective plumbing and stone drains that have become so foul as to be unfit for use. So long as this state of things exists we may expect to have to battle with this "fell destroyer."

The following are the number of cases of contagious diseases reported during the year:—

Month.	Typhoid.	Diphtheria.	Scarlet Fever.	Measles.	Total.
January		2	8		10
February	2	3	3		8
March	6		3		9
April	51	1	3		55
May	13	2	4	3	22
June	9	1			10
July	7	3	6		16
August	5	2	2	4	14
September	5	5	1		11
October	6	1	19	1	27
November	6	10	18	4	38
December	13	9	4	2	28
Totals	124	39	71	14	248

Total number of deaths from contagious diseases:—

Typhoid	9
Diphtheria	9
Scarlet Fever	3
Total	21

Wells.—During the year there were thirty-one wells filled up, and 290 new consumers were added to the list of those who are using city water works water. This is a cheering indication that the people are losing confidence in the purity of the well-water of the city of Kingston, and I hope the time is not far distant when there will not be found a well, used for domestic purposes, in the whole municipality.

Drains.—The following tile drains were built this year, under the Local Improvement Act :—

	Feet.	Inch tile.
Victoria street	1,340	12
Stanley, Lansdowne and Adelaide street	998	"
Division street	825	"
Gordon "	731	"
Albert "	725	"
Barrie "	400	9
Princess "	280	"
Cherry "	260	"
King "	265	"
Total number of feet	5,824	

These drains have been built in very much needed districts, and the people living along the line of these streets will be materially benefited, on sanitary grounds, by their having been built.

Scavenger Work.—The work of the city scavenger this year has been very satisfactory, the present employee has done his work well, fewer complaints have been made than in any year in the past, since the work has been under the control of the health department.

There were 620 permits issued to empty privy pits, from which were taken 4,449 barrels of forty gallons capacity, 134 dead animals were removed from the public streets, lanes, alleyways and harbour, 201 yards were reported dirty and 116 privy pits. Several persons were required to cleanse their premises, and put them in good order.

I would again call the attention of the Board to the question of building branch drains to dwelling houses. The system under which this work is done is a pernicious one and productive of great danger to the health of the public, and a good deal of unnecessary expense to the individual. If the work was controlled by the corporation, as it ought to be, there would not be the defective work done in the building of these drains as is done by the irresponsible persons engaged in this work. Now that a network of drains is extending all over the city, steps should be taken at once to put a stop to the dangerous work that has been going on in this connection.

Narrow Streets.—The question of narrow streets is one which ought to engage our attention more than it may have done in the past. In all districts where the streets are narrow, disease lurks around, pestilential ail fails to find an outlet, and the inhabitants are stricken on every hand, while wide streets act as lungs to the human body, giving health and vitality to the whole physical fabric. Therefore, care should be taken that no property owner should be allowed to open a street of a less width than sixty-six feet, as is done at the present time.

Ice Supply.—Special care was taken this year to obtain the best supply of ice, for domestic purposes, the harbor could afford. All those requiring ice for such uses were made to take it beyond the line determined by the Board, and only for cooling purposes was it allowed to be cut within that limit.

Milk.—During this year twenty-eight licenses were issued to parties to sell milk in the city, each vendor entering into an agreement, under seal, to furnish milk of a standard of not less than three per cent. fat, to report any contagious disease in his family or any disease amongs this cattle, to keep his premises clean, etc., etc., and at any time his failure to do so being proven, his license would be cancelled. No tests of the quality of milk supplied had been made, as the necessary apparatus for such purposes has been but recently received. The instrument obtained is a Feser Lactoscope with all necessary instructions, procured from the Inland Revenue Department, Ottawa.

SAMUEL H. FEE, M. D.,
Medical Health Officer.

London.

Medical Health Officer's Report.

Seventy-nine cases of infectious diseases were reported by physicians as follows: 41 of scarlet fever of which 8 died; 20 of diphtheria of which 10 died; 12 of typhoid fever, 7 of which proved fatal. 344 deaths occurred compared with 373 last year. Taking the population of the city according to this year's census returns at 31,240 gives a death-rate of 11.1, or in other words 11 deaths for every thousand of the population. This low death-rate, the lowest yet reached by any city and probably the lowest of any city or town in the Dominion will be more readily understood and appreciated when it is stated that the mortality last year in the thirty cities and towns of the Dominion made a ratio for the whole of 21 deaths per thousand in the population. Consumption, as usual, carried off the largest number, 41; heart disease is given as the cause of 13 deaths; cancer and Bright's disease 12 each, and la grippe, which we all hope to see no more, 7. Thirteen violent deaths occurred as compared with 9 last year, as follows: 2 by railway accidents; 4 by other accidents; 5 by drowning; 1 by suicide and 1 by homicide. The unusually large number of 34 are put down to still-born, while the goodly number of 29 died of old age. The 2nd and 3rd wards lying along the river again show the smallest number of infectious diseases. From the 1st ward there were reported 14 cases; from 2nd, 6; the 3rd and 6th wards 15 each; the 4th 20, and the 5th 19. The large number of still-born is remarkable, and out of all proportion to the whole number of deaths. The fact that the number is annually increasing should afford food for reflection for all thinking people. Still-born are no part of the deaths, not having had a separate existence they are, therefore, not included in mortuary returns. Apparently there was a larger number of cases of infectious diseases than last year without, however, a corresponding increase in the number of deaths. This must be accounted for from the fact that medical men report cases more promptly.

Of the sanitary work done during the year 124 visits were made to country dairies and 222 samples of milk examined at the Health Office besides many samples of water. 19 contaminated wells were clossd; 23 caused to be cleaned; 13 persons made to connect their premises with the common sewer and a careful inspection of all meats sold upon the market. In general the meat was of good quality. Some were condemned and destroyed. One carcass, that of a sheep, offered for sale by a Westminster butcher or dealer, was found to be affected with tuberculosis. 103 citizens' complaints were received compared with 76 last year, which might suggest to evil minded persons a lack of charity and brotherly love among the people of London. Many anonymous letters are received complaining that this person or that has an infectious disease in his or her family which has not been reported. These statements, upon investigation, are generally found to be incorrect.

The draining, of what is called "Geary's Flats" in the 6th ward, by direction of the Board of Health was a sanitary work which will prove of great benefit to that part of the city, but much of the good resulting from this will be negatived unless sewers are laid down on Craig street and the part of the Wortley Road in order to intercept the sewage which still flows into these flats.

One of the most important things in connection with the sanitary condition of the city is the plumbing. On several occasions I have directed the attention of the Local Board to the necessity of having the Council exercise some supervision or control over the plumbing done in the city, and protect, as far as possible, those who are obliged to live in rented houses from slow poisoning by escaping sewer gas. Much of the plumbing done in the city is of the cheapest and worst description. The Council has the power to pass a by-law regulating plumbing work and remove this source of danger from the people.

The frequent and thorough flushing of the sewers in dry weather is absolutely necessary for the preservation of the public health, but as our sewers are constructed it is impossible to flush them in the way it should be done in order to accomplish the desired results with as little waste as possible. Much of the force of the water is lost before

reaching the sewer proper by having to pass through so many angles. To obviate this I would recommend that man-holes be placed at the intersections of the trunk sewers like the one the City Engineer recently put down at the Wellington and Waterloo crossings.

A number of deaths recently occurred in a neighboring city from contagious disease contracted at public funerals. In this city public funerals have been held and the public invited and allowed to see the body where the persons had died of an infectious disease before the Health Officer had received any notice of the death. In order to secure prompt information of all such deaths I would advise that at the next meeting of the Council a by-law be passed making it compulsory for undertakers to register deaths at the Health Office. The new amendments by the Provincial Board of Health to the regulations governing epidemics of diphtheria, which is now in force, read as follows: "No person sick with diphtheria, or the body of any person having died of diphtheria, shall be removed at any time except by direction of the Medical Health Officer." Section 7 is as follows: "In case of the death of any person suffering from diphtheria or croup the Medical Health Officer shall at once be notified by either the physician or party in charge of the body, and the Medical Health Officer shall take such steps in the preparation of the body as he may deem necessary."

In some of the slaughter houses in the vicinity of London the practice prevails of feeding hogs on the refuse of slaughter houses. Without doubt the flesh of hogs fed in this manner is unfit for food. I would recommend the Board of Health to take whatever action they see fit to prevent as far as possible the sale of such meat in the city.

Consumption, which annually causes the largest number of deaths, being readily communicated from one person to another, is in other words, a contagious disease. School Boards should exercise care and discrimination in the selection of teachers for our Public Schools and employ none who show any signs of this insidious disease which so many have, yet so few are willing to admit.

Although a site for a small-pox hospital or cottage was selected last winter by the Board of Health at the south end of Colborne street on the bank of the river, nothing has yet been done towards erecting a suitable building. The site is as good a one as can be obtained; the soil dry and sandy; the drainage good and a safe distance from the general Hospital or any dwelling, and in the opposite direction to the prevailing winds. The building could be a frame hospital on the pavilion plan as in Montreal, or what is called "The Bunker Portable Hospital," costing about $600 and intended to be burned at the close of the outbreak. This, of course, would be expensive. A permanent building costing $1,500 painted with special material which could be thoroughly disinfected when disease had appeared would be the best for this city. Plans of these hospitals will be submitted if required.

What we should do with our sewage is still an unsolved problem. Year after year I have recommended the plan of constructing an intercepting trunk sewer along the river for the purpose of conveying all the sewage to an irrigation farm below the city instead of allowing it to enter the river. This trunk sewer would collect the sewage from the other sewers making them as it were tributaries, carrying it along the left bank of the river to the low lands below the Cove and having sufficient fall, pumping engines or tanks would not be required. One acre of land is enough for 1,000 people; 18 acres would be quite sufficient for London.

The disposal of sewage by spreading it over land where it is speedily destroyed by oxidation is coming more and more into practice by cities in America and Europe. The sewage from the London Asylum for the Insane with 1,200 inmates has been successfully disposed of in this way for three years on the same four acres of land, and there is no reason why it should not prove as successful for all time to come. Fear that a point will be reached when supersaturation of the soil will take place is groundless. Destruction of deleterious, liquid matter when spread upon soil and exposed to the action of the air and sun is sufficiently rapid to prevent the creation of disease germs. The plan of placing large tanks at the mouth of the sewers and treating the sewage by chemical before it reaches the river, is expensive and will never be effective. The objection to the inter-

cepting sewer is the cost, but sums of money will be spent in litigation constructing flood gates at the dam and other experiments, but sooner or later the city will have to face the music. Through the laudable efforts of the chairman of the Board (Alderman Ivey) plans and estimates of the cost of this sewer are now being prepared by Mr. Willis Chipman, C.E., of Toronto, and it is hoped that before the end of another year this constant source of trouble and annoyance, the disposal of the city sewage, will be arranged to the satisfaction of all parties.

T. V. HUTCHINSON, M.D.,
Medical Health Officer.

Ottawa.

Medical Health Officer's Report.

The total mortality during the year from all causes has been 908 exclusive of still-births. Reckoning the population of Ottawa at 45,000, this gives us a death-rate per thousand of 20.17—a very fair showing upon the whole it must be admitted. Notwithstanding this fact however, it will be observed from a comparative table here appended that our death-rate from zymotic or preventable diseases is still much larger than it should be; thus of the 908 deaths during the present year 310 are due to causes classed under the head of preventable diseases.

It should be remembered, however, that by far the larger number of these have succumbed to diarrhœal disorders which during the summer months generally prove so destructive to infantile life, and that the death roll in this class is largely swelled by our foundling institution, the inmates of which are recruited far and wide throughout the surrounding country.

Among other diseases which have contributed their victims in this class, we have scarlet fever, diphtheria and croup. Twenty-four deaths resulted from the first during the year whilst the two last had claimed 30 and 14 respectively.

The fatalities from scarlet fever, an epidemic of which prevailed throughout the city during the past year, were fortunately few compared to the total number of cases of this disease that occurred. The very mildness of the type of the disease being a cause of its spread by people often poor financially but rich in progeny, and not always prepared to call in the doctor for every apparently slight ailment that may occur in the household, and who have had the diseases without knowing it unwittingly have been the means of spreading the infection.

Diphtheria and croup, though not largely prevalent at any time during the year, kept constantly cropping up so that at no time was this Department, which exercises a special surveillance over them, without some such case in the isolating hospitals or outside of these, in private houses. Proportionately according to numbers, far more fatalities from these diseases occurred among the German population. Possibly owing to their too frequent disregard of hygiene living and their determined obstinacy in caring for such cases in their own peculiar ways.

Typhoid fever, which is also included in the above mentioned class of diseases was less prevalent this year than in previous years. Thus instead of nineteen (19) deaths from this cause as recorded for last year, there are but nine for the period covered by this report. If we take into consideration the facts that during the latter parts of the summer and early in the fall, the waters were very low, a condition said to be favorable to the development of this disease and that in many places within the city there was going on upturning of the sub-soils, necessitated by the construction of drains, a circumstance also favouring the development of this disease, if not actually capable of originating it, we seemingly have in the limited number of fatalities from this cause satisfactory evidence of the wholesomeness of our water supply.

The Hospitals.—The two hospitals for the isolation and care of infectious diseases have been maintained throughout the year on a satisfactory footing of efficiency and the degree of usefulness of these institutions may be inferred from the following records of the past year which show that 131 cases were treated therein with 14 deaths; the full details being given in a table here appended.

The number of infectious cases reported to the Health Department during the year were in all 335 as follows:—

Scarlet fever	196
Diphtheria	80
Measles	32
Typhoid fever	27
Total	335

Owing to the fact that isolation is not enforced in typhoid cases as in others above mentioned, I have not as rigidly exacted from physicians the report of cases of that disease and consequently I do not look upon the number of typhoid fever cases reported above as representing the number of cases that did actually occur in the city during the past year.

The revised and consolidated by-laws which came in force this year have amended the by-law effecting the milk supply of this city in force during the previous year in such a way as to make its workings rather unsatisfactory owing to the fact that some of its clauses are found to be actually impracticable to the ordinary milk vendor; and the fact also that the carrying out of the provisions of said by-law are to a very large extent under the control and supervision of the Police Department. Little or nothing was done during the past year as regards the testing of samples of that article of food. It is apparently a case in justification of the saying that what is everybody's business is nobody's business or that too many cooks spoil the broth.

The ice supply of the city for household use is taken altogether from the Ottawa River. Some ice dealers take all their supply from above the Chaudiere Falls whilst others take part above and part below the Falls at such points as are permitted by the present regulations of this Department. As regards these, I believe that if they consulted their own interest in a business point of view they would take all their supplies above the Chaudiere Falls and thereby all compete on an equal footing in offering their customers an article of equal purity.

Taking all circumstances into consideration it is gratifying to know that the present year upon the whole has been marked by satisfactory progress in sanitary improvements. Thirty-three subsidiary sanitary drains on as many streets of the city have been recommended during the year by your Board and approved of by the Council. Some of these are now being completed, among the most important of which are drains on Albert, Queen street west, Sparks, Clarence and Bolton streets.

Others will no doubt be pushed to completion during the present fall whilst a number possibly will not be under way until the next season.

The great benefits in a sanitary point of view resulting from these drains already constructed are being duly appreciated by the people, and gladly taken advantage of by this Department whom they enable to effect the removal of unsanitary conditions and in some localities the abatement of that unmitigated nuisance the privy pit.

For details in this as well as for all matters more immediately under the control of the Sanitary Department I beg to refer you to the Sanitary Inspector's Report.

The system organized to effect the removal and disposal of household refuse and general yard cleanings, early last spring, like all undertakings of this kind in their beginnings, has not given that amount of general satisfaction during the past year which experience and some modification of the contract will enable this Department to effect in

the future. To a very large number, however, it supplied a long felt want and facilitated the performance of that important work of sanitation.

It is gratifying to know that the school authorities from year to year have been improving the condition of our schools both Public and Separate, as regards ventilation, heating and closet accommodation to a degree commensurate with their responsibilities and the importance of the above mentioned matters to the welfare of their charge. Among the improvements that were effected last year in this respect I gladly record the fact that half a dozen or more of our schools, with a past appreciation of the hygienic condition of their surroundings, have removed therefrom the objectionable privy pits to replace them with metallic troughs in connection with our water system by which they are cleansed thoroughly every 24 hours.

As regards scavenging and all details pertaining thereto I wish to refer you again to the Sanitary Inspector's comprehensive and intelligent report for the year just ended and dealing specially with such matters.

In concluding this report I feel it to be an act of justice incumbent upon me to bear testimony to the sobriety, energy and worthiness of the men employed in the Health Office ; at the same time permit me, gentlemen, to direct your attention to the inadequacy of the salaries paid these men as well as to the officers under whose charge they are working.

The nature of the duties which officers of the Health Department are required to perform call for the exercise of prudence, tact, courage and endurance to an extent seldom demanded of the employees of any other department of the Municipal Government.

Such qualities should be remunerated to a degree more nearly commensurate with the duties performed.

A. ROBILLARD, M.D.,
Medical Health Officer.

STRATFORD.

Medical Health Officer's Report.

I would congratulate you on the awakening of the people up to the proper support of their sanitary interests. This is evidenced by the action of the Board in taking cognizance of all unsanitary conditions which endanger the public health, and discussing sanitary requirements intelligently, by the people in their more cheerful compliance with all health regulations, by the number of complaints regarding the unsanitary condition of their neighbour's surroundings, by the comments of the press, relative to existing contagious diseases, by the amount of sanitary work done, and last but not least, by our exceedingly low death rate.

This is as it should be for no other temporal interest can be compared in importance with that of popular sanitary education. Generally speaking, the causes of our unnatural mortality depend on public conditions which can be reached only by public measures brought forth by every class identifying the public good with that of its own in sanitary education. The Board being sensible that sanitary reform can best be bettered by educating the people to understand the pecuniary profit of public health, is desirous to do away with every possible unhealthy circumstance without using arbitrary or extreme measures or conflicting seriously with personal pecuniary interests.

Our death-rate for the past year has been exceedingly small, there being 101 deaths giving the low general death-rate of 10.1 per thousand in a population of about ten thousand. Of these 20 were due to zymotic causes, chiefly diphtheria. The number of cases of this disease reported during the year were 39 of which 18 cases proved fatal. This was the result of a local outbreak of the disease of a very malignant character, during

the month of May, which was traceable to a child having attended school while suffering from the disease. By great watchfulness, prompt and efficient isolation and disinfection, what threatened to be a dangerous outbreak was averted.

There have been 36 cases of typhoid fever reported with two deaths. This together with the fact of no deaths occurring from scarlet fever is a matter for congratulation.

There were a number of cases of measles reported during the spring but it was of a very mild type, consequently no fatal cases.

There have been only six deaths from consumption, a small percentage of the number of deaths.

Milk Supply.—The milk supply of the city is furnished from about twelve dairies, all of which have been inspected, particular atttention being paid to the nature of food used, the condition of stables and premises as regards ventilation and drainage, and state of the udders, and the water supply. With one or two exceptions these were found satisfactory. The milk from these dairies was tested six times and results published. On the whole it made a very good showing. I am pleased to note a great improvement in our milk supply.

Garbage.—Last year I directed the attention of the Board to the necessity of pro viding some system for the frequent removal of all vegetable and animal refuse from private yards. This is a matter of no small importance as decomposing organic matter is one of the most fruitful sources of diphtheria and other fevers. To have this done efficiently a by-law should be passed appointing some responsible person to remove such matter at stated times, at fixed rates.

Hog-pens.—From the Inspector's report I find there were 41 pig-sties in the city of which all were ordered to be cleaned and 16 removed. A number of complaints have been made during the year of their being a nuisance and as it is almost impossible to keep them clean, particularly in warm weather, I would urge upon the Board the necessity of asking the Council to pass a by-law prohibiting the keeping of pigs within the city limits.

Inspection of New Houses.—Three or four cases of typhoid fever have come under my notice of late, the cause being attributable to a lack of proper trapping and ventilation of the cellar drain. This suggests the necessity of having a systematic inspection of all new houses and putting in force the regulations of by-law 15, regarding the construction of houses, drainage plans, ventilation of drains, description of drain pipes, etc.

The owners of all new houses were informed that the policy of the Board was to enforce the dry-earth system, and the necessity of its adoption was urged upon them. The result was that this system has been adopted in nearly all of them, the remainder from convenience or choice preferring a cesspool.

Schools.—In company with the Chairman of the School Board I personally visited the school premises and found the sanitary condition good with the exception of one or two of the closets. The Chairman with his usual promptness in business had the matter at once attended to. I have pleasure in stating that the trustees and teachers do all in their power to protect the children against the destructive agencies in the form of infectious and contagious diseases.

Our Streets.—The Street Commissioner deserves credit for the removal of the mud from some of our principal streets. This mud, which is mixed with decomposed vegetable and animal filth, when dry is blown in the form of dust and inhaled becoming frequently a source of diphtheria, bronchitis, fevers, etc. Apart from its abatement and removal of unsanitary conditions and surroundings, it makes our city more cleanly and more attractive to our own citizens as well as to the visiting public.

J. A. ROBERTSON, M.D.,
Medical Health Officer.

St. Catharines.

Chairman's Report.

The duties expected to be performed by a Local Board are sometimes not of a very pleasant nature, but the work of the past year has not been arduous, the Board depending principally upon the Inspector, who reports monthly of all work or other requirements coming under his supervision.

The general health of the city is fair, with the exception of a little flurry over scarlet fever which appeared to be of a mild form. The citizens themselves by a little precaution could assist to a large extent in preventing the spread of contagious diseases.

The Health Act and its requirements have not been fairly understood by the general public; this we have endeavored to remedy by having printed extracts from the Public Health Act circulated among families and at the public schools.

Out of the thirty-nine cases of infectious diseases reported by physicians only two were reported as ending fatally.

The number of deaths as per City Clerk's return for all cases during the year is 117, from which I take the liberty of deducting ten deaths from the following causes: Old age, 3; still born, 4; suicide, 1; drowned, 2; leaving the actual deaths from ordinary diseases only 107, or a death-rate of 10.7 per one thousand, which is probably the lowest of any city on record.

The sanitary work of cleaning closets and cess-pools, should be prosecuted with more energy than has been heretofore shown. A larger staff of scavengers should be employed, and the Inspector should see that the work is thoroughly done in all cases, without any exception. All closets must be cleaned out and disinfected.

And then with the system of drainage inaugurated, and a general use of city water, a thorough cleaning up, and all physicians properly reporting infectious diseases, there is no reason why we should not enjoy a still greater degree of healthfulness than ever.

S. G. DOLSON,
Chairman.

Statement.

The number of Medical Returns of contagious diseases for the year ending 15th November, 1891, is 39 cases as follows:—

Typhoid fever	12
Diphtheria	6
Scarlet fever	16
Measles	5
Total	39

And the number of deaths reported is 2.

Toronto.

Medical Health Officer's Report.

During the past year many important changes have been made in the management of the Department. Your ready acceptance of my recommendations has enabled me to appoint a staff of specially trained men to the posts formerly occupied by those possessing no special qualification for their work. The good results following the adoption of this system are so obvious and have created so much popular approbation that no comment is necessary here. This change is simply in accordance with the progress made by other large English and continental cities in sanitary matters.

But in spite of the advance made in this respect, the causes of preventable disease remain largely the same, and the death rate in the past year from this class of disease has been high. We have been visited by a severe outbreak of diphtheria and typhoid fever, the origin of which this Department has, by diligent investigation into individual cases, been able to trace, in the majority of instances, to specific unsanitary conditions. The presence of foul privy pits has been the most prolific source of these diseases, and promises to be the most permanent evil the Department will be called upon to deal with; for here we meet the opposition of a formidable array of landed interest. I am glad, however, to be able to state that with your indorsement, measures have been taken for the proper isolation of the diseases referred to. Funds have been provided for the building of a quarantine hospital, where all contagious and infectious diseases may be effectually isolated. An appropriation of $1,500 has been made for the erection and equipment of a superheated steam disinfecting station, where all infected clothing may be disinfected.

During my term of office I have caused regular analyses of milk to be made by the analyst of the Department with highly satisfactory results. The quality of milk has been first class. Tubercular diseases, constituting as they do one-seventh of the aggregate from all causes, demand most careful consideration. In this connection herds have been inspected, infected animals destroyed, and the possibility of infection thus averted.

The city water, as shown by analyses, though variable, has been on the average good. The recent action of your Board in prohibiting the cutting of ice from the bay will, without doubt, raise the future quality of our ice supply, and we may therefore eliminate it from the category of Toronto's disease producing sources.

Your Board has taken effective measures in prohibiting the use of garbage dumps in the city, and deciding that instead fire shall in future be the means of destruction. By this process all the disease-breeding matter will be destroyed, and the chance of infection therefrom avoided. I beg to congratulate you also upon the improved sanitary condition of Ashbridge's Bay and the Don lagoons. Your action in these matters has probably been the means of preventing an epidemic. It is worthy of remark that these parts of the city have been the least affected by recent outbreaks, and it is to be hoped that permanent improvement will minimize the possibility of future visitations.

The question of an abattoir has engaged a considerable portion of our attention during the past year. The principal cities both of Europe and America pronounce strongly in favour of the abattoir system. Many diseases, such as hog cholera, trichinæ, tuberculosis, etc., otherwise propogated, are by this means effectually avoided. In this respect we are behind other cities, but it is hoped and expected that this will not long be the case. During the past year there was an outbreak of hog cholera, but happily its progress was checked in Toronto. The more recent outbreaks in other parts lead us to suspect that the authorities at Ottawa have failed to act promptly in the matter.

Although typhoid fever and diphtheria have been more prevalent in this district than in any other in the city, proving that the sanitary condition is not what it might be, there are few nuisances of sufficient importance to require special mention in this report. Complaints received both from citizens and house to house inspectors nearly always deal with minor matters, and have special reference to privy pits. The following are a few of the most important matters coming under the notice of the Department in this district:

In the vicinity of Manning avenue and Bloor street, and within a radius of a quarter of a mile, there are situated 15 slaughter houses. These have all been visited at one time or another during the past summer and have always been found to be in a scrupulously clean condition. Notwithstanding this the residents in the locality complain most bitterly of the odors arising from them, especially in the summer months. The smell is so bad that even on warm evenings the residents are compelled to keep their doors and windows closed and to remain indoors. There is such a unanimity of opinion that there can be no doubt of the truth of this. I can quite credit their statements, as even when these places are kept perfectly clean their number would be sufficient to give rise to the vile smells no matter what care may be taken to keep them in a proper condition.

Scavenger Dumps.—The neighborhood most imposed upon in this respect is also in the vicinity of the slaughter houses mentioned above. About here there are numerous ravines which they have been attempting to fill up with scavenger refuse. These ravines are so deep that it is impossible to drain them. The rain water lodges in them, and as all sorts of refuse, both animal and vegetable, is deposited there the smell when decomposition sets in is something vile. Since this has been complained of the dumping has ceased, much to the relief of the residents in the vicinity.

Contagious Diseases.—Great difficulty, inconvenience and in many cases impossibility has been experienced in the isolation of cases of infectious disease owing to lack of hospital accommodation.

A house to house inspection was made of the district bounded on the south by Queen street west, on the east by Yonge street, on the west by University street, and on the north by Avenue street. A few houses remain to be inspected in this district, in which, as well as in the district mentioned above, we found privy pits which had not been cleaned for three years or more. Some of these pits were in as close proximity to the kitchen door as two feet. In several of these pits there were thirty-two barrels or more to be removed. It is to be greatly regretted that our present by-law does not provide for the removal of these pits in any case. A very striking example of this may be seen on Elizabeth street, near Queen street, where the privy pit of the house on Queen street is placed not more than two feet from the kitchen door of the house on Elizabeth street.

The Elizabeth street house is a first-class building, while the Queen street house is very inferior, yet our police magistrate holds that under the present by-law we cannot compel the removal of this privy pit. Another very striking example may be seen in the rear of Frichot street, where a row of fine brick houses cannot be rented because of a row of no less than nineteen privy pits which are only ten feet from the rear of the houses. In many large factories where many men are employed, an immense pit is in use without any adequate provision to prevent a nuisance being created.

Report of Medical Health Officer re Abolition of Privy Pits.—During the past three months we have been carefully analysing the various complaints received in this department, and find from a careful examination that from sixty to sixty-five per cent. of the complaints received, are based on nuisances caused by the presence of privy pits. In the older portions of the city the percentage is even higher. Such a complaint received, a notice is sent to the owner, the privy is emptied and the nuisance abated; but only for a time. In a few months, certainly by the end of a year, the pit is in exactly the same condition. Another notice is sent, and so it goes on. It is plain from this that sixty to sixty-five per cent. of the work of this department is of no permanent benefit. These pits are nearly all made of boards nailed together, and no attempt is made to have them water tight. The fluids consequently soak through into the earth, saturating it with filth, and remaining there after the privy is emptied. A great many people think it quite an advantage to have these loose boxes so that the liquids may run out, and will often, when ordered to empty a privy pit, complain that it is only water that is in it, and if left alone it will soak away in a short time. In certain sections privies are so numerous and so close to houses as to be a menace, if not positively dangerous to health. The denser the population the fewer the water closets, seems to be the rule, the more closely built portions having nearly all pits. In many cases there are houses built in the rear. These almost invariably have pits, and in nearly every instance the privy is placed just where the kitchen door is located, or beside it. In warm weather, especially, the air is contaminated, and the smell is distinctly perceptible. Contaminated air is heavier than pure air, and generally stinking organic vapors are heavier than, and tend, on that account, to hang around the localities from which they emanate. The report of the General Board of Health to the British Parliament, concerning the administration of the Public Health Act, and the Nuisances, Removal and Diseases Prevention Acts from 1848 to 1854, says: "In another instance the abolishing of cess pools and their replacement by water closets, together with the abolishing of brick drains and their replacement by self-cleaning stoneware pipes, has been attended with an immediate and extraordinary reduction in mortality. Thus, in Lambeth Square, occupied by a superior class of operatives in the receipt of high wages,

the deaths, which in ordinary times were above the general average, or more than 30 in 1,000, had risen to a rate of 55 in 1,000. By the abolishing of cess pools, and the construction of water closets, and with the introduction of tubular self-cleaning house drains, the mortality has been reduced to 13 in 1,000."

The reduction of the mortality was effected in precisely the same districts, and among the same occupants, without any change in their habits whatever.

"In the case of the Square, when cesspools and drains of deposit were removed without any alteration whatever in the adjacent sewers, fevers disappeared from house to house, as these receptacles were filled up and the water closet apparatus substituted merely in consequence of the removal of the decomposing matter to a distant sewer of deposit or open water course. If the mortality were at the same rate as in the model dwellings, or in the improved dwellings in Lambeth Square, the annual deaths for the whole of the metropolis would be 25,000 less."

The committee appointed by the Society of Arts in 1876, to enquire into various subjects in connection with the health of towns, among their conclusions have the following:

"For health's sake, without consideration of commercial profit, sewage and excreta must be got rid of at any cost. That the pail system, under proper regulations, for early and frequent removals, is greatly superior to all cesspools and ash pits, and possesses manifold advantages in regard to health and cleanliness, while its results in economy and faculty of utilization, often compare favorably with those of water carriage sewage; that all middens, cess pools and privies, in towns, should be abolished by law.

Again, the committee appointed by the Local Government Board, in 1875, report: "That the retention of refuse and excreta in cess-pools or other places in the midst of towns, must be utterly condemned."

There can be only one opinion, privies should not exist in cities. The first great step toward the improvement of the sanitary condition of Toronto should be the abolition of all privies. It is undoubtedly highly desirable, the only possible objection being expense, which, in the face of this overwhelming evidence, I do not think should be considered, in such a sanitary improvement, whereby hundreds of lives may be saved.

In examining into the last 249 cases of zymotic disease, as to cause, I find these occurred in 228 houses. Of these, 63 per cent. had foul privy pits. Experts agree with the view that virus of diptheria may lie dormant until suddenly an environment of foul and putrescent material affords the requisite for its development, and outbreaks are the result.

Recommendations.—In view of the above facts I would recommend that a by-law be passed to compel owners, lessees, etc., of real property, to fill up these privies, and substitute therefor, either water carriage or the improved pail system. It is impossible for us in Toronto to think of wiping out contagious and infectious diseases in our midst by any precaution or treatment, while effective machinery for their reproduction is in existence, and in all cases which we have been able to trace, and which have been reported to us by medical men throughout the city, all are unanimous in condemning the privy pit as the most prolific cause of these loathsome diseases.

Correspondence re Privy Pits.

Office of the Medical Health Officer,
Toronto, September 28th, 1891.

To His Worship Mayor Clarke, City Hall:

Dear Mr. Mayor,—I have to-day received letters from Professor William Oldright, M.D., Dr. Cassidy, Chairman of the Provincial Board of Health, and Dr. Bryce, Secretary of the Provincial Board of Health, addressed to Your Worship, and setting forth

their opinions as to the necessity of abolishing privy pits as proposed by the Board of Health. As these gentlemen are eminent sanitarians, and, as therefore, their opinions must carry great weight in this matter, I would ask your Worship that these letters be printed and placed before the members of the council at their meeting to-night.

Respectfully yours,

NORMAN ALLEN.

TORONTO, September 26th 1891.

E. F. Clarke, Esq., M. P. P., Mayor of Toronto:

SIR,—I have been informed that there is still some opposition to the passage of the by-law for the abolition of privy pits, and have been requested, in common with some other medical men, to send you an expression of opinion on the subject. It is so difficult to understand how any well-informed person in this last decade of the nineteenth century, can defend these disgusting relics of barbarism, that I hardly know what points to take up in a letter which must necessarily be brief.

1. The extent and magnitude of soil pollution is one point of which few people, I think, have an adequate idea, and I will give one or two facts to illustrate it. In one block in St. John's Ward, 67 x 200 yards, a physiological calculation shows that there are deposited annually, from 14 to 18 tons of solid excreta. What must be the condition of the soil? This question may find some approach to an answer from the statement of two observations of the excavation of sites much less thickly settled: When the Wellesley School required an addition some four years or so ago, the site, about 43 x 28 feet, was excavated down to the clay, and the soil on the surface of the latter gave forth a strong odor. This resulted from the filth spreading from a row of school privies on the east side of the site, towards a well at the south-west angle of it, about 50 feet distant. A more recent example was the stench arising from an excavation for a cellar on King Street, the emanations from which excavation, gave rise to a case of diphtheria. I called the attention of the Health Department to the circumstances of this case at the time, as it was a good object lesson on soil pollution.

2. I have again and again traced cases of disease to privy pits, and can name specific cases to the Health Department, if required to do so.

3. From the statistics collected by sanitary authorities *re* privies, I think we may safely say that hundreds of persons are annually killed in our province by these abominable pits. The share of Toronto would be over 200 if they were allowed to flourish without any restriction. I trust that the aldermen will realize their responsibility for the loss of life consequent upon their partial retention.

4. I have been given to understand, as I readily can, that the stirring up of these collections of filth, in the process of the cleaning out of pits in certain sections of the city, has been followed by the outbreak of cases of diphtheria and typhoid fever, and that these outbreaks have been anticipated and verified by the officials of the Health Department.

I would point out to those persons who seem more influenced by a financial than by a humane consideration of this question, that any laxity or half-heartedness in regard to health matters, is going to injure our business interests. We have a beautiful, healthy, thriving city, and we must maintain its reputation.

Hoping these few disconnected observations will be received in the spirit in which they are written.

I am, yours truly,

WM. OLDWRIGHT.

TORONTO, September 28th, 1891.

E. F. Clarke, Esq., Mayor of Toronto:

YOUR WORSHIP,—In reference to the proposed by-law which provides for the abolition of the noisome privy pits in this city, I have little to say except words of praise. Even though our water supply is not poisoned by these, the air in the vicinity of the dwelling is made noxious, more particularly to children who pass much of their time in the yards. I am in favor of introducing a water closet into every dwelling and house of public resort in the municipality. If, for any sufficient reason, a water closet cannot be obtained, a dry earth or ash closet, under municipal control, should be the next best system.

To sum up thus: In my opinion the best system would consist of a trunk sewer, treatment of sewage at the outfall and discharge of putrified effluent into the bay. 2. The general use of water closets preceded by the abolition of privy pits until the more expensive improvements can be brought about. The use of water closets should be encouraged, the disuse of privy pits made obligatory, dry earth or ash closets under municipal supervision being substituted, and a large crematory should be provided for the destruction of the excreta and any other offensive garbage.

Your obedient servant,
J. J. CASSIDY, M.D.

TORONTO, September 28th, 1891.

To Norman Allen, M. D., Medical Health Officer, Toronto:

DEAR DOCTOR,—In reply to your request that I should present my views with regard to the proposed by-law for the abolition of privy-pits from within a certain area in Toronto, I have to say that the necessity for the measure has so long been apparent, that the repetition of arguments therefor, at the present day, seems wholly superfluous.

But from the standpoint of a local nuisance, their existence in populous neighborhoods is intolerable. To think that the evaporation from them in the long, dry summer months, makes it possible for the germs which are present in such receptacles, to be borne into the air with every breeze, to be added to all other air pollutions of a city, is enough to demand their immediate abolition by all who wish to improve the city's health.

To indicate how laden is the air of the city with germs of various kinds, it may be said that one minute's exposure on a glass plate of some medium which aids their growth, will show in twenty-four hours numerous forms to have settled on a surface of six square inches; while a delicate balance will show a change in weight if an object be exposed for an hour to the free air of a laboratory.

The existence of sewers on most streets makes the adoption of some form of water carriage for sewage, possible, and by far the most practicable and sanitary method.

Nearly every premises on the clay soil of older Toronto requires a sewer to drain the cellar and foundation walls. The same house drain, once laid, can be easily made to do service both for this purpose and for carrying sewage and house slops.

The easy, efficient, and least expensive apparatus is a porcelain sink, placed in the outer kitchen or shed adjoining the house, leading to the drain, and having a trap with a manhole for cleaning it, placed beneath the frost line. The drain would be ventilated on the sewer side by a pipe running high into the air outside the house. A water-pipe for flushing the sink is laid from the kitchen tap, and may be turned on there when required. This constructed for a few dollars, (not exceeding $10 or $15) will dispose of house slops, kitchen slops, and by a convenient cover arrangement added, may be used as a water closet.

This method, once systematically undertaken by your department, would so speedily convince landlords of its cheapness, and occupants of its convenience and sanitary value, that I am certain the cumbrous and imperfect—because troublesome—system of earth closets would not be thought of.

After years of observation of practical methods of sewage disposal, I am more strongly than ever in favor, for large cities, of the principal "*tout a l'egout*," *everything to the sewer*, which is prevailing more and more every year.

I have the honor to be,
Your obedient servant,
PETER H. BRYCE.
Secretary.

Report on Hog Cholera in Toronto and Vicinity.—In August last word was received at this office of the existence of a disease among hogs in the district around the city, the name or cause of the disease being quite unknown to the owners. Information was also received at the time that the meat of hogs suffering from the disease, and having died from it, was being offered for sale by the butchers of the city. I immediately proceeded to investigate the truth of these reports. Many of the places where hogs are kept, especially in the district east of Toronto, were visited, and in almost every instance it was found that either the disease was present or had existed during the last few months. In some cases men had lost as much as 75 per cent. of their stock, one man informing me (and he is only in the business in a small way), that he had lost $200 worth in one week. Sufficient evidence was also secured to show that the majority of these hog raisers, finding that the disease had been so fatal in the past, now kill the animals as soon as the disease manifests itself. As there seemed to be nothing known as to the cause of the disease, or as to its nature, an investigation was made with the following results:

Symptoms.—The first indication is the refusal of the hog to eat. The animals affected refuse to move and isolate themselves from the rest of the herd, or if they attempt to walk their movement is a staggering one. They are affected with a cough, the eyes become watery, the ears assume a dark purple color, and the belly also becomes of a darkish hue. In many cases purging is present, although not always. Death ensues in from three to fourteen days after the animal is affected—rarely later.

Post Mortem Appearances.—Both lungs are solid. Pericardium full of serum. Sometimes heart adherent. Spleen more or less enlarged, dark and friable. Large intestine with numerous yellowish looking ulcers of the "punched out" variety. These are especially numerous in the coecum. A microscopic examination of the lungs showed the condition to be one of simple pneumonia in the third stage. The heart lesions simply indicate pericarditis. The ulceration of the intestines strongly resembles typhoid ulceration in man. A culture has been made of the germ obtained from the lung, and has been identified positively as the germ causative of hog cholera. The above symptoms and post mortem occurrences also agree with this diagnosis, and there is no doubt in my mind that this is the disease under consideration. In further proof of the above two rabbits have been inoculated, one dying on the seventh day, with symptoms such as are produced in rabbits from the germ of this disease. A dog has been fed on the meat of a hog dying of this disease, but no effect has been so far noticed.

This disease is essentially North American. The only literature found dealing with the subject is the report of the Bureau of Agriculture at Washington, as to the danger to man from eating this meat. This report states that there are only two diseases allied to it, typhoid fever and dysentery. The connection of this disease with typhoid is rather vague, on account of the latter being a universal disease, whereas hog cholera, as stated above, is essentially limited. With dysentery, the connection is much more close. It cannot be positively stated that the eating of this meat would cause either condition in man, but to say the least, it must be regarded with suspicion. Under sec. 99 of the Consolidated Health Laws, it is specified that hog cholera is a disease in which the meat of animals so suffering, is unfit for human food. We have communicated with the Department of Agriculture at Washington, as to the danger to man from eating this meat, and they have replied that they have heard of no case where hogs so affected have been eaten. From the Provincial Bureau it is learned that there has been only one known outbreak of this disease in Ontario.

As there is great danger of this pork being used as human food, and as it may seriously interfere with the great hog trade of the city, I think that immediate steps should be taken to eradicate the disease. This can only be done by killing and burning or burying deeply all animals so affected, and isolating all not affected, then thoroughly disinfecting the premises by prohibiting the keeping of hogs again on the same, for a period of one year.

I would therefore advise that your Board communicate the above facts to the Government Inspector, Dr. Andrew Smith, with the request that he should take immediate action as indicated. On investigation I find that the men who keep these hogs feed them to a great extent on offal from slaughter houses, and the swill from hotels and restaurants. It is possible that this swill, if used fresh, may make good food for hogs; but there can be no doubt that the feeding of flesh is highly dangerous, as in this way many of the diseases peculiar to animals, are known to spread. I would therefore advise that your Board adopt certain additions to By-law 2478, whereby no one should be allowed to sell meat in the city of Toronto, unless licensed by the Local Board of Health to do so, and that all butchers so licensed should (on pain of having his license revoked if not complying), notify the Health Officer in any case coming to his knowledge of diseased animals or meat; that the use of all slaughter houses be prohibited for the feeding of hogs, and that no swill shall be used unless in a perfectly fresh state.

All of which is respectfully submitted.

NORMAN ALLEN, M. D.,
Medical Health Officer.

—	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter Houses, etc.,	Removal of Garbage and night soil.
Strathroy	The proper inspection of dairy cows and their surroundings.	.....	.....	S. F.—3.	Healthy state due to system of drainage.	In tolerably good condition.	
Woodstock	House to house inspection. Milk sold, tested and found good.	Pure water supply will lessen death rate. Some well waters found bad on examination, used by schools.	Several cases of diphtheria and typhoid.	T.—4 deaths.	The deepening of a creek to carry off sewage recommended. Also the condition of Close's pond referred to.	.....	700 dry earth closets in use. Council to regulate disposal of night soil.
North Toronto	Thorough inspection on part of inspector where infectious diseases existed.	System of water supply in course of construction.	The law re reporting of infectious diseases to be strictly enforced.	D.—5. T.—11. S. F.—5.	.....	Thorough inspection of slaughter houses and pig-pens.	Dry earth closets to be established instead of privy vaults.
Brockville	Milk supply on the whole reported good. Whole town thoroughly inspected.	An excellent water supply and sewer system lessens the diphtheria and typhoid cases.	.....	D.—4. T.—16. S. F.—30.	.....	Slaughter houses looked after.	
Dresden	House to house inspection made	.....	.....	D.—1. T.—2.	.....	.....	The adoption of dry earth closets recommended.
Dundas	Inspection of all yards, etc. made.	Well water impure, but a system of water works has been partially constructed.	Placarding and isolation always adopted in cases of infectious disease	D.—3. T.—1. S. F.—8	Without sewers.		
Galt	Inspection of milk, offered for sale from time to time made.	Water supply at Central School found unfit for use, its discontinuence ordered.	A few cases of diphtheria, typhoid, scarlet fever and measles reported.	.....	The question of sewage called to the attention of Board.		

TOWNS.—*Continued.*

—	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter Houses, etc.	Removal of Garbage and night soil.
Barrie	The milk supplied considered good. Vaccination neglected.	The water in some wells found impure. The wells in each case ordered to be filled up.	Typhoid epidemic due to impure water, caused by wells being too close to privy pits. Isolation, disenfection, etc. strictly enforced. Isolation hospital recommended	D. 14. T.—40. S. F. 7.	Drainage on an extensive scale carried on during the year.	Slaughter-houses thoroughly inspected. The keeping of swine in towns and villages ought not to be tolerated.	The emptying of privy pits and removal of garbage done under supervision of inspector. Privy pits to be abolished and dry earth closets to take their place.
Napanee	Sanitary inspector reports but few nuisances.	.....	.....	A few cases of typhoid reported.	.....	.....	.....
West Toronto Junction	An inspection of schools and premises made by M. H. O.	A system of water supply as well as wells in use.	Placarding in infectious diseases in every instance.	D.—3. T.—2. S. F.—1.	A system of sewerage under construction.	.....	A scavenger looks after the removal of garbage, etc
Paris	No satisfactory inspection of the milk supply.	A system of water works in operation.	Isolation, etc., adopted to prevent spread of infectious diseases.	D.—12. T.—22. S. F.—A number of cases.	.....	.....	Privy pits still in use.
Owen Sound	Inspection of milk made on two occasions.	.....	Placarding and isolation adopted to prevent spread of infectious diseases.	D.—17. T.—9. S. F.—16.	One drain constructed, and others needed.	.....	.....
Walkerton	.....	M. H. O. recommends that water for drinking purposes be supplied from water works system.	Most of typhoid cases in low lying part of town, where cellars are damp.	D.—A few cases T.— " S. F.— "	.....	.....	.....
Simcoe	A general inspection of town by inspector.	.....	.....	.....	Some drains became offensive because of scarcity of water to flush them.	.....	All accumulations of garbage were removed promptly by citizens.

Peterboro'	Efficient house to house inspection was carried out during the year.	Water is found to be of varying degrees of purity according to location.	Isolation disinfection in infectious diseases.	D.—45. T.—18. S. F.—26.	A sewerage system for the town is taking a practical shape.	No trouble with slaughter-houses and pigs were kept outside of town.	The cost of the removal of garbage out of the general taxation is recommended. A large number of earth closets have been substituted for vaults.
Cobourg		Water supply good.	Isolation, placarding and disinfection in infectious diseases.	D.—1. T.—3. S. F.—30.	1,826 feet of drainage laid during the year.	Inspection of slaughter-houses made.	
Milton	Secretary reports that special attention has been given to wells, drains, privy pits, etc.		A few cases of diphtheria and measles reported			A slaughter-house nuisance abated. Greater restrictions should be placed upon the keeping of hogs in towns.	
Seaforth	Any cases of unsanitary conditions were attended to.			D.—3. S. F.—2.			
Bowmanville	Sanitary condition excellent.		A few cases of typhoid.		Drainage of town good.		
Whitby	Sanitary enactments difficult to enforce because of apathy on part of Board.		Physicians neglect to report infectious diseases.	D.—2. S. F.—1.			
Almonte	An efficient inspection of town by sanitary inspector.		A few cases of infections diseases.				Arranging for the proper disposal of refuse of yards and privies the chief trouble.
Niagara Falls	The Simcoe street nuisance the only one giving trouble.		Free from infectious diseases.				
Walkerville	House to house inspections made during the year. Milk supply good.	Water supply from Detroit river.	School closed and other precautions taken to prevent spread of diphtheria.	D.—24. S. F.—1.		Some evils in connection with cattle byres were remedied.	Some water closets still exist without sewer connection.

TOWNS.—*Continued.*

	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses, etc.	Removal of Garbage and night soil.
Collingwood			Placarding and disinfection in infectious diseases.	D.—5. T.—32. S. F.—10.			
Mt. Forest	The cleaning of yards, etc., is looked after each spring.		A few cases of diphtheria reported.		Better drainage for the town needed.		
Lindsay		Waterworks soon to be established.	Some cases of diphtheria occurred through want of isolation.	D.—11. T.—7. S. F.—3.	A system of sewerage needed.		
Listowel			A few cases of diphtheria, typhoid and scarlet fever.		Natural drainage not good.		The use of dry earth closets recommended by M. H. O. All garbage removed in the spring.
Brampton	Sanitary condition of town fair.			T.—2. S. F.—A few cases.			
Perth			Free from infectious diseases.			Slaughter-houses were removed from the built up parts of the town.	
Picton			Free from infectious diseases.				A nuisance in connection with a canning factory abated.
Meaford		Wells in too close proximity to privy pits	Most of the cases of diphtheria due	D.—60. S. F.—4.			Board is making exertions to do

		and as a consequence water impure.	to bad well water. Wells contaminated by privy pits. Placarding, isolation, disinfection and closing of schools to prevent spread of diphtheria.				away with privy pits and substitute earth closets
Sandwich				D.—A few cases.	Sanitary condition of town much improved owing to recent drainage.		
Midland		Well at one school cleaned.	Isolation carried out in infectious diseases.	D.—8. T.—15. S. F.—10.	Street drains in a good condition.		Privy pits cleaned by emptying out contents. Dry earth closets recommended.
Port Arthur	M. H. O. recommends the building of a hospital for infectious diseases.	M. H. O. points out need for a system of water works.	Strict isolation and placarding adopted in infectious diseases.	D. 2.	An open drain requiring attention reported by M. H. O.		The inspector ordered the removal of all garbage, etc.
Trenton	Sanitary Inspector made an inspection of all slaughter-houses, bake shops and provisions offered for sale.	Water at one of the schools analysed. The cutting of ice under direction of M. H. O.	Placarding, etc., and notification of school teachers in infectious diseases cases.	D.—34. S. F.—4.	A system of sewerage and water supply needed.	Some complaints made regarding pig pens.	M. H. O. recommends use of dry earth closets.
Kincardine			Free from infectious diseases.			Slaughter-houses not kept in a desirable condition.	Dry earth closets recommended.
Windsor	A sanitary inspector appointed to devote his time to inspection and abatement of nuisances. No milk inspection carried on this year.	Pollution of water supply has increased somewhat. 63 wells were closed up.	Infectious diseases controlled by notification disinfection and isolation.	D.—32. T.—6. S. F. 6.	7,000 feet of sewers built during year.	One stable nuisance reported.	Privy vaults in too close proximity to dwelling condemned by M. H. O.
Goderich	Secretary reports the year as an exceptional one.			S. F. 1.			

—	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria. Typhoid. Scarlet Fever.	Drainage.	Slaughter Houses etc.	Garbage and Night-soil.
Watford	The careless ones have been made keep their premises in a proper condition.	Soil being clay, wells are not in danger of being contaminated by soakage from privies etc.	A few cases of typhoid and diphtheria. Isolation in above diseases.		A defective sewer the cause of typhoid. One drain has caused some trouble.		
Merritton		Supplied with water from Lake Erie.	Disinfection etc., used to prevent spread of infectious diseases.	D.—3. T.—1.			
Oakville	The health of town unusually good during year.		The Board exercises the utmost vigilance to prevent spread of infectious diseases.	D.—4. S. F.—3.			
Oil Springs		The water in wells in portion of village condemned and largely responsible for the typhoid fever.	Typhoid epidemic, scarlet fever prevalent, and in many cases the fact was concealed to prevent placarding, and these cases mingling, with public a source of communication.				
Richmond	Sanitary conditions of village good.		Precautions taken to prevent spread of diseases.	D.—1. S. F.—2.			
Fenelon Falls	House to house inspection made	Sufficient care has not been taken to exclude surface water from wells, hence many are impure.	Free from infectious diseases.	T.—1.			A nuisance exists in the form of a stench from a pulp mill.
Tilsonburg	The residents assist in keeping town in a sanitary condition.		A few isolated cases of typhoid which were carefully looked after.				

Fergus	Sanitary inspector caused all nuisances to be abated.		Isolation etc., in diphtheria cases.	D.—3. S. F.—1.
Port Colborne	Village in a healthy condition.		Physicians report punctually cases of infectious diseases, and Sec'ty sees that house is placarded at at once.	T.—2.
Morrisburgh	Sanitary condition of village good.		A few cases of measles and scarlet fever.	
Deseronto	Two inspections of village made during year.		A few cases of typhoid fever.	
Minden	Sanitary condition of village satisfactory.		Isolation in infectious diseases.	D.—1.
Alexandria	Two complaints of premises in unsanitary condition, which were remedied.		The typhoid and scarlet fever attributed to stagnant water of mill pond.	T.—10. S. F.—A few cases.
Stouffville	House to house inspection made.		With exception of typhoid, free from other infectious diseases.	T.—2.
Arnprior	Some complaints re unsanitary premises were remedied.		Free from infectious diseases.	
Uxbridge	An inspection of village made by Sanitary Inspector.		Typhoid due it is thought to prolonged dry weather.	T. 25.
Elora	Sanitary condition of village excellent, no nuisances reported.		Free from infectious diseases.	
Preston	An analysis of the milk sold was made and found satisfactory.	M. H. O. suggests that a rigid inspection of all wells be made.	Placarding, disinfection and isolation carried out in infectious diseases.	D.—12. T.—9. S. F.—6.

VILLAGES.—*Continued.*

	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter Houses etc.	Garbage and Night-soil.
Beaverton	Sanitary condition of village satisfactory.		Some difficulty was experienced in enforcing placarding.	D.—1. T.—A few cases.			
Point Edward	Notices were sent to each householder *re* the cleaning of their yards.		Placarding, isolation and disinfection in infectious diseases.	D.—7. S. F.—3.			
Glencoe		Water in wells made unfit for use because of flooding of yards by heavy rains.	Several cases of typhoid reported.				The Secretary hopes that yards and closets will receive special attention.
Newburgh	The people readily comply with regulations of Sanitary Inspector.		Free from infectious diseases.				
Streetsville	House to house inspection made.			D.—2. T.—2.	Attention of the Council called to need of improving the drainage.	The keeping of pigs in villages ought to be discouraged.	
Chesley	All yards etc., kept clean.		Has been free from infectious diseases.		Is well drained.		No garbage allowed to accumulate.
Milverton			Free from infectious diseases			The slaughtering of animals prohibited within village.	
Lakefield	A thorough inspection of village by Inspector.		If first case of scarlet fever had been reported, second would not likely have occured.	D.—2. T.—6. S. F.—2.		Slaughter houses are kept outside of village, but pigs are still allowed inside.	

Wiarton	House to house inspection made.	An extension of supply pipe into deeper water needed to insure pure water.		D.—2. T.—1.	A system of sewerage recommended by M. H. O.	Slaughter houses removed outside corporation limits.	A scavenger appointed to look after removal of garbage etc.
Bracebridge		The water of some wells found impure.	Impure well water the cause no doubt of some cases of typhoid.	D.—3. T.—A number of cases.			
Niagara Falls	House to house inspection made by Sanitary Inspector.		Free from infectious diseases.				
Forest			A few cases of diphtheria and scarlet fever.			M. H. O. urges the removal of cowbytes beyond limits of village.	M. H. O. advises that it be made compulsory to have all privies cleaned twice a year, and public outhouses disinfected once a month.
Sterling	Thorough inspection of village by Sanitary Inspector.		Free from infectious diseases.				
Embro	Some minor nuisances abated during the year.	Some wells received a thorough cleaning.	M. H. O. has great faith in placarding as a means of securing isolation in infectious diseases.	S. F.—8.			
Norwich		The proper flushing of water tanks for fire purposes neglected.		T. 1.	The proper drainage of a stagnant pond made.	Periodical inspection of slaughter houses was made.	M. H. O. recommends use of dry earth closets.
Brussels	All yards etc., were regularly inspected.			T.—1. S. F.—A few cases.			
Beamsville	A number of complaints satisfactorily dealt with.		Placarding notices sent to school teachers in cases of infectious diseases.	S. F. 3.			
Vienna	Sanitary condition of village good.		A few cases of whooping cough.				

VILLAGES.—*Continued.*

—	General Inspection.	Water Supply.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter Houses etc.	Garbage and Night-soil.
Teeswater			Free from infections diseases.				Several complaints *re* water-closets.
Exeter	All householders were notified to put their premises in a sanitary condition.			S. F. 1.			
Dunnville	House to house inspection carried out.			D.—1. T.—1. S. F.—5.			
Beaverton	A thorough inspection of all back yards and premises made.		Defective drain the cause of typhoid case.	T.—1.			Privy vaults replaced with dry earth closets.
Colborne			Isolation and disinfection used in infectious diseases.	D.—1.			
Thedford	The sanitary inspector performed his duties efficiently.			D.—A few cases. T.—4.			
Port Perry	Secretary reports the year as healthy.			D.—2. T.—3. S. F.—1.			
Blyth	Sanitary inspector is diligent in his duties.		A few cases of typhoid fever.		Special attention is given to drainage.		
Millbrook	Sanitary condition of village good.		Isolation and disinfection in infectious diseases.	D.—2. T.—2.			
Newcastle	A thorough inspection of village made.	The water in all wells found satisfactory.		D.—2. T.—3.			

—	General Inspection.	Water Supply.	Cheese Factories.	Infections Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Mariposa	Inspection of all villages made.	Water supply in some school sections neglected.	One cheese factory nuisance abated.	Placarding in all cases.	D.—1. T.—5. S. F.—3.		
Oro				A few diphtheria cases reported.	D.—10.		
Seneca		Wells in some parts uncleaned.		Diphtheria and typhoid more prevalent than last year.		Bad drainage cause of diphtheria, etc.	S. H. inspected pig-pens too near to dwellings.
Garafraxa, West	A nuisance in the form of a filthy conditioned house removed. Inspection of school houses and premises.	Cleaning of wells once a year recommended. Wells of school found in good condition.		Typhoid appearing in undrained parts of township.			One slaughter-house found unsatisfactory.
Downie		Water supply of schools looked after.		Free from infectious diseases.			
Hibbert	Inspection of school houses made.			A few cases of infectious diseases reported.			Hog cholera occurred in early part of year.
Clarke	Inspection of school houses made.		Cheese factories inspected and found in fairly good condition.	A few cases of diphtheria only.	D.—3.		
Sullivan	School houses and premises were inspected.			Isolation in infectious diseases always carried out.	D.—1.		
Woolwich				An epidemic of diphtheria reported with six deaths.			Complaint made of a number of carcasses left unburied.

TOWNSHIPS.—*Continued.*

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Sydenham				Cases of diphtheria, typhoid and scarlet fever reported.	T.—8. D.—7. S. F.—A number.	Drainage in village of Leith recommended.	
Humberstone	Nuisances abated by order of inspector.		Kept in good condition.	Measles and la grippe prevalent.	D.—2.		
Dereham	Inspection of township by sanitary inspector.	Backwardness on part of majority of population to have wells cleaned out.		A few cases of diphtheria and typhoid.			
Wainfleet					D.—3. T.—2.	A great deal of drainage done, hence very little stagnant water.	Dairies and pig-pens need attention.
Emily	Calls the attention of Board to the necessity of supplying physicians with blank forms to report infectious diseases.			Isolation adopted in infectious diseases.	D.—2. S. F.—4.		
Maryboro	Vaccination neglected.				T.—1.	A drain without a proper outlet reported.	
Innisfil				A few cases of diphtheria and scarlet fever reported.			
Gloucester				Strict insolation adopted in infectious diseases.	D.—A few cases. S. F.—A few cases.		No complaints regarding slaughter-houses.

Southwold				Isolation adopted in infectious diseases.	T.—5. S. F.—A number of cases.		
Sarawak	School privy vaults found to be in a filthy condition by inspector.			Free from infectious diseases.			
South East Hope		All School Boards were requested to have wells at their respective schools cleared out at summer vacation.		A few cases of scarlet fever.			All owners of cider mills were notified to remove all offal in connection with their presses.
Elma				A few cases of diphtheria reported.		The increased drainage throughout township is lessening cause of disease.	Owners of slaughter houses were notified to keep their places as the law directs.
Glanford	Secretary furnished physicians with blank forms re reporting of infectious diseases.			Physicians have neglected to make return of infectious diseases.	D.—1. T.—3.		
Dysart	No nuisances reported during year.	The water supply good.		Free from infectious diseases.			
Hallowell					S. F.—42.		
Osprey	M. H. O. recommends schools and their outbuildings should be yearly inspected. More general vaccination of pupils attending school.	An adequate supply at all times of the year.		A few cases of scarlet fever and one case of typhoid. Neglect shown on part of physicians to report infectious diseases.		Good natural drainage.	
Manvers				In the opinion of the M. H. O. five cases of diphtheria were caused by bad well water.	D.—32. S. F.—2.		

TOWNSHIPS.—*Continued.*

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Flamboro, East	Greater precautions are taken *re* the prevention of disease than heretofore.			A few cases of measles, mumps and whooping-cough.			
Chaffey	M. H. O. draws attention to the Act *re* the appointment of M. H. O's. in unorganised townships.			Free from infectious diseases during the year.			
Scott	The township has been free from nuisances during the year.			The severe drought causing lowness of well and spring waters the probable cause of typhoid.	D.—4. T.—A number of cases.		
Thorold	One Complaint made to the Board during the year.			A few cases of diphtheria and whooping-cough reported.			
Cartwright				Isolation and placarding adopted in infectious diseases.	D.—4. S. F.—1.		
Louth	Better ventilation of school houses recommended by M. H. O.	The M. H. O. points out the importance of a pure water supply at schools.		Every precaution taken to prevent spread of infectious diseases.	T.—1.		A frequent cleaning of piggeries and privy pits should be insisted upon.
Hullett	No nuisances reported.				T.—1. S. F.—A few cases.		

Brooke			Inspection of cheese factories in township.	A few cases of typhoid and scarlatina.		Complaint made *re* stagnant water along track of railway.	The condition of slaughter-houses better than in former years, owing to inspection.
Tiny		Water supply the cause of two of the cases of typhoid.		Diphtheria and typhoid epidemic, isolation, disinfection and placarding adopted to prevent spread	D.—20. T.—24.		
Murray		The water supply generally responsible for typhoid.	Cheese factories should be inspected.	Reports, neglect on part of physicians in reporting infectious diseases.	D.—3. T.—1.		A thorough inspection should be made.
Erin		Well at one school closed because of impurity of water.		A few cases of scarlet fever and measles.			One pig-pen nuisance abated.
Blenheim	Inspection of school premises and grounds made.				T.—2.		Slaughter houses removed from immediate neighbourhood of village and kept in good condition.
Saugeen				A few cases of typhoid and diphtheria reported, isolation and disinfection carried out to prevent spread.			Two slaughter-houses complained of put in a sanitary condition.
Turnberry			One cheese factory, pig-pen reported a nuisance.	M. H. O. observes that the law should be better complied with *re* the reporting of infectious diseases.			One pig pen and slaughter-house nuisance reported and abated.
Logan	Sanitary condition of township good.			A few cases of diphtheria and scarlet fever.			

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Mornington	Some diseased cattle looked after by government inspector.				D.—A few cases. T.—1.		
Grimsby, South	Eight cases of nuisances reported to inspector and satisfactorily disposed of.			Measles and mumps prevalent.			
Guelph	A house containing diphtheria patients reported unfit for habitation and removed.	One well with impure water at school-house reported.		A few cases of diphtheria.			Some cattle sheds put in proper condition.
Caledon	Burying ground in Alton village too centrally situated. Soil being porous there is danger to public health.	In parts of township impure because of pollution of streams and wells.		Typhoid due to impure water. Some cases of scarlet fever reported. Diphtheria reported due to damp cellars and decaying vegetable matter.	T.—23.		A number of hog-pen nuisances dealt with.
Sandwich, East					D.—3. S. F.—1.		
Nichol				Placarding in infectious diseases.	T.—6. S. F.—A number.		
Wallace	An inspection of all schools and grounds recommended. No systematic vaccination practised.	No report as to the purity of drinking water supplied to schools.		A few cases of diphtheria.			
Ancaster					D.—2. T.—3. S. F.—3.		All slaughter-houses, etc., inspected by M. H. O. and San. Inspector.

Aldborough				The law *re* reporting of infectious diseases on part of physicians not at all complied with.	T.—2.		
Whitchurch				Board did not consider it necessary to take any action to prevent spread of contagious diseases.	D.—7. T.—Several cases.		
Goderich		A plentiful supply of pure water at all the schools.		No cases of infectious diseases reported.			
Ameliasburgh				Diphtheria and scarlet fever prevalent. School closed to prevent spread.	D.—Many cases. S. F.—100.		
Minto				A few cases of diphtheria.			One slaughter-house complained of.
Yarmouth	All school premises put in a sanitary condition.						Slaughter-houses inspected.
Wellesley		Impurity of water supply the cause of a case of typhoid.		The holding of funerals in diphtheria and like diseases to be discouraged.	D.—Number of cases. T.—3.		A conviction secured in a case in which an animal suffering from actinomycosis was offered for sale.
York	Inspection of township made regularly by Inspectors.	The water supply of some schools not considered pure.		Diphtheria epidemic at Bracondale. Apathy on part of physicians to prevent spread of disease reported. Also cases in other parts of township.		Complaint made *re* the draining of slop water from Hillcrest Home in an open ditch.	Slaughter-houses and pig-pens kept in satisfactory condition

TOWNSHIPS.— *Continued.*

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
Gwillimbury, East					D.—8. T.—12. S. F.—2.		Committee of Bd. appointed to look after slaughter-houses.
Bruce				Precautions to prevent spread of diphtheria, etc., were taken, such as notification of school trustees and teachers.	D.—A number of cases. T.—12. S. F.—A number of cases.		
Orillia	Sanitary condition of township good.			One case of glanders in a horse, which was killed and buried.	D.—1.		
Crowland				Measles were prevalent.	T.—1.	More attention given to drainage by farmers than in former years.	
Stamford	School grounds have been inspected.		Those in charge of dairies have kept them in good condition.	Placarding in infectious diseases.	D.—3. S. F.—3.		Slaughter-houses kept in good order.
Beverly				Placarding in infectious diseases adopted.	T.—1. S. F.—4.		
Maidstone	Supervision on part of Board of township efficient.			A few cases of diphtheria and typhoid.		An excellent system of drainage in operation.	
Metcalfe				Infectious diseases to be promptly reported by physicians.	T.—1. S. F.—A few cases.	Extensive drainage operations carried on during the year by council.	

Euphrasia	M. H. O. notified a School Board to close school in *re* diphtheria cases. Trustees ignored notice.			Neglect on part of physicians to report infections diseases. Isolation disinfection used to prevent spread; also placarding.	D.—19. S. F.—50.		
Flamboro', West	A careful inspection made of all school premises.		Twenty dairymen granted permits.	Free from infectious diseases.			Slaughter-houses inspected, and permits to 12 butchers granted.
Summidale	Ventilation and lighting of some schools defective.	Drinking water; from wells.		One case of typhoid and a few cases of scarlatina.			
Esquesing		West branch of river Credit polluted by washings from Acton tannery.			D.—1. T.—A few cases.		
Kinloss				Measles and whooping cough prevalent in early part of year.	T.—3.		One slaughter-house nuisance abated.
Reach				Physicians careless about reporting infectious diseases in their practice.	D.—6. T.—2.		
Toronto		Water at one school impure because of well being too near to a filthy privy vault. Diphtheria prevalent at said school.		Decaying animal and vegetable matter the principal cause of scarlet fever.	D.—8. T.—6. S. F.—19.		Many of the slaughter-houses are not at the prescribed distance from roads and dwellings.
Burford					D.—3. T.—2. S. F.—2.		

TOWNSHIPS.—*Continued.*

—	General Inspection.	Water Supply.	Cheese Factories.	Infectious Diseases.	Diphtheria, Typhoid, Scarlet Fever.	Drainage.	Slaughter-houses and Pig-pens.
East Luther	.....	.....	.....	A number of cases of diphtheria and typhoid. Isolation adopted to prevent spread.	.....	Some swamp lands need draining badly, the diphtheria cases being in the neighbourhood of these lands.	
Dumfries, North	Inspection of the premises of those supplying milk to villages made.	Local Board drew the attention of trustees to the necessity of a pure water supply for schools.	Cheese factories inspected.	Physicians do not report infectious diseases as promptly as they should.	D.—2. T.—3.		Slaughter-houses inspected.
Hawkesbury, West	The sanitary inspector made a tour of inspection.	.....	.....	Isolation and placarding in infectious diseases.	D.—6. S. F.—14.	Some stagnant water in village of Hawkesbury needs attention.	
Hope	Complaints re deposits and garbage on lake shore made.	Water supply pure	.....	Free from infectious diseases.	.....	Good natural drainage.	Slaughter-houses regularly inspected.
McKillop	Some cases of tubercular disease existed among cattle, but the rigid inspection proposed will stamp it out.	.....	.....	Remarkably free from infectious diseases.	.....	.....	A nuisance in the form of a pig-pen in connection with a cheese factory was remedied. Other cases of nuisances abated.

ALPHABETICAL INDEX.

A.

PAGE.

A hundred years of sanitation in Ontario 3

Animal Diseases, reference to 52

C.

Cassidy, J. J., M.D., report on International Congress of Hygiene and Demography 43

Cemeteries established 37

Chairman's Annual Address 81

Cholera, introduction of into Canada 5

Cholera, the first sanitary commission issued in Canada to deal with ..... 6 to 16

Cholera, table giving number of cases in Toronto 15

Contagious Diseases, table giving those imported into Canada by way of St. Lawrence including Cholera ..... 15 and 16

Contagious Diseases, copy of Order-in-Council passed in 1888 regarding 24

Contagious Diseases, outbreaks of ..... 32 to 35

Correspondence *re* Detroit River Quarantine Inspection 59

County Health Officers 38

D.

Diphtheria cases in Toronto 32

Diphtheria, reference to 51

Diseases of Animals Act amended *re* power of M. H. O 24

Diseases of Animals referred to 36

I.

Isolation Hospitals, notes regarding them 33

Interstate notification 33

L.

List of the reports, addresses, etc., presented to the Board by its Committees .. 18 to 20

Local Boards, formation of, 1883 21

M.

Milk Supplies, inspection of 37

Milk Supply Problem from the Public Health Standpoint and some practical methods for securing safe public supplies by Dr. P. H. Bryce 70

N.

PAGE.

Nuisances from mill-dams 38

P.

Public Health Work in Ontario, ten years of, under the following classification :
Machinery of Public Health Work. Collection of Sanitary Information. Dissemination of Sanitary Information. Health Legislation. Investigation into Causes of Disease. Outbreaks of Disease. Food and Drink Supplies. School of Hygiene. Public Institutions ....17 and 18

Public Health Legislation and Machinery of Public Health Work 20

Public Health Act, preparation of 21

Q.

Quarterly Report of Secretary *re* Water Supplies and Diphtheria 49

Quarterly Report of Secretary *re* Animal Diseases 52

Quarantine Inspection at Detroit River, correspondence regarding 59

R.

Report of Delegate to International Congress of Hygiene and Demography, by J. J. Cassidy, M.D 43

Report of the Secretary *re* the Acton Tannery 54

Report of the Secretary *re* Streetsville Cemetery 56

Report of Neustadt Tannery 56

Report *re* the Ontario Vaccine Farm 57

Report *re* Sanitation in Listowel 58

Report of Secretary *re* Sewerage at St. Mary's 63

Report *re* Proposed Sewerage System for Toronto Junction 66

Report of Secretary *re* disposal of Sewage at Agricultural College 69

S.

Smallpox, regarding its prevalence 32

Smallpox, how it should be treated 32

Spread of Disease by School Children 34

T.

Transportation of the dead 37

Transportation of the dead, communications regarding and resolutions 64

V.

Vaccination, copy of circular sent to municipal clerks regarding it 22

W.

	PAGE.
Water Supplies, public in Ontario	26
Water Supplies, table showing analyses in many places	26 to 27
Water Supplies, study of tables of	28 to 31
Waterworks, system of sewage	36
Water Supplies	50

ANNUAL REPORTS OF LOCAL BOARDS OF HEALTH:

CITIES.

	PAGE.		PAGE.
Belleville	81	London	93
Brantford	81	Ottawa	95
Guelph	89	Stratford	97
Hamilton	90	St. Catharines	99
Kingston	91	Toronto	99

TOWNS.

	PAGE.		PAGE.
Almonte	109	North Toronto	107
Bowmanville	109	Napanee	108
Brampton	110	Perth	110
Brockville	107	Picton	110
Barrie	108	Paris	108
Cobourg	109	Peterboro'	109
Collingwood	110	Port Arthur	111
Dresden	107	Owen Sound	108
Dundas	107	Seaforth	109
Galt	107	Strathroy	107
Goderich	111	Simcoe	108
Kincardine	111	Sandwich	111
Lindsay	110	Trenton	111
Listowel	110	Whitby	109
Milton	109	Woodstock	107
Mount Forest	110	Walkerville	109
Meaford	110	West Toronto Junction	108
Midland	111	Walkerton	108
Niagara Falls	109	Windsor	111

VILLAGES.

	PAGE.
Alexandria	113
Arnprior	113
Beaverton	114 to 116
Bracebridge	115
Brussels	115
Beamsville	115
Blyth	116
Chesley	114
Colborne	116
Deseronto	113
Dunnville	116
Elora	113
Embro	115
Exeter	116
Fenelon Falls	112
Fergus	113
Forest	115
Glencoe	114
Lakefield	114
Merritton	112
Morrisburg	113
Minden	113
Milverton	114
Millbrook	116
Newburgh	114
Niagara Falls	115
Norwich	115
Newcastle	116
Oakville	112
Oil Springs	112
Port Colborne	113
Preston	113
Point Edward	114
Port Perry	116
Richmond	112
Stouffville	113
Streetsville	114
Stirling	115
Tilsonburg	112
Teeswater	116
Thedford	116
Uxbridge	113
Vienna	115
Watford	112
Wiarton	115

TOWNSHIPS.

	PAGE.
Ancaster	122
Aldborough	123
Ameliasburg	123
Brooke	121
Blenheim	121
Bruce	124
Beverley	124
Burford	125
Clarke	117
Chatfey	120
Cartwright	120
Caledon	122
Crowland	124
Downie	117
Dereham	118
Dysart	119
Dumfries, North	126
East Luther	126
Emily	118
Elma	119
Erin	121
Euphrasia	125
Esquesing	125
Flamboro', East	120

TOWNSHIPS—*Continued.*

	PAGE.
Flamboro', West	125
Garafraxa, West	117
Gloucester	118
Glanford	119
Grimsby, South	122
Guelph	122
Goderich	123
Gwillimbury, East	124
Hibbert	117
Humberstone	118
Hallowell	119
Hullett	120
Hawkesbury, West	126
Hope	125
Innisfil	118
Kinloss	125
Louth	120
Logan	121
Mariposa	117
Maryboro'	118
Manvers	119
Mornington	122
Minto	123
Maidstone	124
Metcalfe	124
McKillop	126
Murray	121
Nichol	122
Oro	117
Osprey	119
Orillia	124
Reach	125
Seneca	117
Sullivan	117
Sydenham	118
Southwold	119
Sarawak	119
South Easthope	119
Scott	120
Saugeen	121
Sandwich, East	122
Stamford	124
Sunnidale	125
Toronto	125
Thorold	120
Tiny	121
Turnberry	121
Woolwich	117
Wainfleet	118
Whitchurch	123
Wellesley	123
Wallace	122
Yarmouth	123
York	123

RA
185
06B18
1891

Ontario. Dept. of Health
Report

Biological
& Medical
Serials

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY